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ЗБІРНИК ЛЕКСИКО-ГРАМАТИЧНИХ ВПРАВ ТА ТЕКСТІВ АНГЛІЙСЬКОЮ МОВОЮ ДЛЯ СТУДЕНТІВ І КУРСУ ІнАЕКСУ

Міністерство освіти і науки України

Вінницький національний технічний університет

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Затверджено Вченою радою Вінницького національного технічного університету як збірник вправ та текстів для студентів першого курсу ІнАЕКСУ. Протокол № 12 від 29 червня 2006 р.

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Збірник містить дев’ять уроків, які складаються з кількох лексико-граматичних вправ та текстів, а також п’ять текстів для додаткового читання та англо-український словник.

Мета збірника – забезпечити підготовку студентів першого етапу навчання (I, II триместри) до самостійного читання, розуміння й перекладу оригінальної науково-технічної літератури англійською мовою, а також розвиток навичок усного мовлення.

Призначений для студентів І курсу ІнАЕКСУ.

УДК 811.111

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Передмова

Даний збірник призначений для студентів І курсу ІнАЕКСУ. Він складений з урахуванням вимог програми цільової підготовки фахівців з іноземної мови і призначений для роботи студентів в аудиторії під керівництвом викладача та поза аудиторією.

Мета текстів спрямована на розвиток навичок самостійного читання у спосіб раціонального використання двомовних словників і збагачення словникового запасу студентів, а також за допомогою аналізу текстів.

Граматично-лексичні вправи мають на меті закріплення та активізацію засвоєння навчального матеріалу, а також розвиток навичок усного й письмового переказу рідною та англійськими мовами, вивчення певних граматичних явищ синтаксичного та структурно-морфологічного характеру. Словотворчі вправи охоплюють усі продуктивні способи словотворення.

В кінці підручника наведено англо-український словник.

Методичні вказівки до роботи зі збірником

Перша частина – 9 уроків, друга – додатковий матеріал, що містить додаткові тексти, таблицю неправильних дієслів, словник.

Кожен урок містить три тексти, які об'єднані спільною тематикою. Всі вони призначені для навчання різним видам читання. Перший текст уроку є основним і підлягає ретельній обробці і аналізу для вивчення тих граматичних і лексичних явищ, що розглядаються в уроці. Другий та третій тексти слугують розвитку навичок читання і отримання необхідної інформації, а також навичок бесіди з відповідної тематики, що сприяє закріпленню лексико-граматичного матеріалу, що пророблявся в основному тексті.

Кожен урок-тема починається з передтекстових вправ для роботи з граматичним і лексичним матеріалом. Вправи складені на основі лексики попередніх уроків. Вправи після основного тексту надані для закріплення граматичного і лексичного матеріалу.

Вправи на словотворення містять, в основному, активну лексику. Для практичного використання набутих знань студентам потрібно володіти умінням самостійно працювати над мовою. Тому автори знайшли необхідним ввести спеціальну серію вправ для самостійної роботи.

Додаткові тексти з тематики лексики пов'язані з основними текстами уроків. Вони призначені для самостійної і індивідуальної роботи та можуть бути використані як додатковий матеріал при проведенні дискусій, бесід, конференцій.

В кінці розміщено словник. Він містить всі слова, що зустрічаються в текстах і вправах.

LESSON 1

Дієслова *to be, to have*
Часи групи *Indefinite (Simple) Active, Passive*
Зворот *there + be*
Порядок слів у реченні
Суфікси *-tion, -ic, -al, -ly*
Text 1A. *Higher Education in Russia*
Text 1B. *Cambridge*
Text 1C. *Higher Education in the USA*

Вправа 1. Поставте подані нижче речення у Past Indefinite або Future Indefinite, додаючи, де необхідно, слова *last/next week, last/next year, tomorrow, yesterday і* т.д.

1. I am very busy today. 2. They are in the reading-room now. 3. It is a cold day today. 4. We are students of one of the Vinnitsya Universities. 5. You are late for the lecture. 6. Mary is a good student. 7. Students have four exams in January. 8. Today they have time to go to the cinema. 9. We have some English magazines. 10. The book has many diagrams. 11. I have good news. 12. She has a map of England.

Вправа 2. Поставте подані нижче речення у Past і Future Indefinite, додаючи слова *yesterday, tomorrow* и т.д.

1. There is a large reading-room in our university. 2. There are thirty students in our group. 3. There is a new film in our club today. 4. There is one telephone in our office. 5. There are many students at the lecture.

Вправа 3. Поставте подані нижче речення у Past або Future Indefinite, додаючи слова *last/next year, yesterday, tomorrow, last/next week, last/next summer і* т. д.

1. We study five days a week. 2. I go to the University every day. 3. My friend lives in a hostel. 4. Usually I get up at 7 o'clock. 5. My studies begin at half past eight. 6. We have four lectures every day. 7. After lectures we go to the dinning room. 8. We do our homework for the next day. 9. At night I read and watch TV. 10. On Sunday I visit my friends.

Вправа 4. Поставте присудок в заперечну форму.

1. Today our lectures begin at 10 o'clock in the morning. 2. We were school-children last year. 3. We had four entrance exams in summer. 4. Yesterday the first-year students saw the institute laboratories. 5. We took all the necessary books from the library. 6.I got excellent marks for my entrance exams. 7. He knows the meaning of the word «engineering» (техніка, машинобудування, інженерна справа). 8. The students of our group will meet in the laboratory. 9. The librarian gave us all the necessary books.

Вправа 5. А. Розкрийте дужки, поставивши загальні питання.

1. (You do)... anything interesting last weekend? 2. (He works) at the institute every day? 3. (They will come) ... to see you soon? 4. (We studied) ... at school last year? 5. (She will go) ... to the theatre next week? 6. (The students worked) ... in the laboratory yesterday? 7. (Ann gets up) ... at 7 o'clock? 8. (There are) ... many laboratories at our institute? 9. (There were) ... many students at the lecture? 10. (There will be) ... a library in the new building? 11. (We have)... two lectures today? 12. (The book has) ... many diagrams? 13. (You had) ... four exams last semester?

В. Вставте відповідні питальні слова.

1. ... is your name? 2. ... doesn't understand this grammar rule? 3. ... of you studies French? 4. ... is the answer to my question? 5. ... do you live? 6. ... were you born? 7. ... lectures you on mathematics? 8. ... do you study? 9. Here are the books. ... is yours? 10. ... knows the answer to this question?

Вправа 6. Поставте питання до кожного члена речення і дайте заперечну форму.

1. He entered the Aviation Institute last year. 2. My sister studies at the university. 3. The third-year students will have industrial training next summer.

Вправа 7. Прочитайте і перекладіть текст.

My University

There are many universities in Vinnitsya. The head of a university is Rector. Usually there are several faculties in a university. Each faculty has a number of specialized departments and is headed by dean. The course of studies lasts (триває) 5—6 years.

The academic year in this country's higher schools begins on the 1-st of September and is divided into two terms (semesters). Students take exams at the end of each semester. If the results of the examinations are good, students get grants. Twice a year students have vacations — two weeks in winter and two months in summer.

My University has several buildings, old and new ones. There are many various laboratories. There is a very good library and a computer center in the main building.

Every faculty has its own specialized library, laboratories, workshops and computer centers.

The first- and second-year students study general engineering subjects (загальнотехнічні предмети). In the third year students begin to study specialized subjects.

A very good tradition of our University is that theory is accompanied by practical training. Students begin to work at the University's well-equipped (має гарне устаткування) laboratories and in senior years at various plants, design offices and research institutes of this country.

It is interesting but difficult to study at our University, especially for the first-year students as they do not know yet how to organize their work and time.

Вправа 8. Перекладіть речення, поставте їх в питальну і, де можливо, в заперечну форму.

1. The books are taken from the library. 2. He was asked to help one of our students. 3. Many newspapers and magazines are published in this country. 4. That problem was discussed at our meeting. 5. The diagrams were brought by our monitor. 6. The exams will be taken in January. 7. They were told to do their work quickly. 8. The study of theory is accompanied by practical training. 9. A new laboratory was opened last year. 10. We shall be given a new task University tomorrow. 11. Every institute is headed by Rector. 12. In summer you will be sent to a big plant for your industrial training.

1. This work must be done quickly. 2. Many complex problems can be solved with the help of computers. 3. Lomonosov may be called the founder of higher education in Russia. 4. Books on this subject can be found in every library. 5. Many basic subjects must be studied by the first and second-year students.

СЛОВОТВОРЕННЯ

Вправа 9. Перекладіть подані нижче похідні слова:

дієслово + tion = *іменник*

to examine — перевіряти, екзаменувати → *examination — екзамен*

to apply —застосовувати, використовувати → application — застосування, використання

to educate — education; to adopt — adoption; to graduate — graduation; to specialize — specialization; to organize — organization;

іменник+ al = прикметник

industry — industrial; profession — professional; person — personal;

іменник + ic — прикметник

science — наука → scientific — науковий;

basis — основа → basic — основний

прикметник + ly — прислівник high — високий → highly — високо

quick — quickly; usual — usually.

Вправа 10. Прочитайте та перекладіть інтернаціональні слова.

qualification, qualified ['kwPlIfaId], speciality [,speSI'xlItI], specialist, special, specialize, engineer [enGI'nIq], serious ['sIqrIqs], adoptĺion, style [staIl], method ['meTqd], distance, system, foundation, satellite ['sxtqlaIt], course [kLs], instruction, mathematics [,mxTI'mxtIks], physics ['fizIks], chemistry ['kemIstrI], history, economics, to concentrate ['kOnsqntreIt], bachelor ['bxCqlq], sport center, basic, exchange.

Вправа 11. Прочитайте та запам’ятайте вимову наступних слів.

high [haI], higher education, highly-qualified, important [Im'pLtqnt], provide [prq'vaId], development [dI'velqpment], process ['prquses], progress ['prqugres], steadily ['stedIlI], enough [I'nAf], through [TrH], thorough ['TArq], quality ['kwOlItI], natural ['nxCrql], science ['saIqns], scientist ['saIqntIst], require [rI'kwaIq], curricula [kq'rIkjulq], foreign ['fOrIn], major ['meIGq], future ['fjHCq], further ['fWDq], research [rI'sWC], enterprise ['entqpraIz], know [nqu], knowledge ['nOlIG], graduate ['grxdjueIt].

СЛОВА І СЛОВОСПОЛУЧЕННЯ ДЛЯ ЗАПАМ’ЯТОВУВАННЯ

as *conj* — як, оскільки
as well — також
affect *v* — впливати
become *v* — становитися
consider *v* — вважати, розглядати, враховувати
develop *v* — розвивати, розробляти
development *n* — розвиток, розробка
enable *v* — давати можливість

ensure *v* — забезпечувати, гарантувати

especially *adv* — особливо
further *a* — подальший
improve *v* — покращувати, вдосконалювати
mean (meant) *v* — значити
means *n* — засіб
number *n* — число
a number of — низка, декілька
to play a part — грати роль
to take into consideration — брати до уваги
at present — в теперішній час
prepare *v* — готувати, підготовлювати
provide v — забезпечувати, постачати
receive *v* — отримувати
remain *v* — залишати
quality *n* — якість
thorough *a* — доскональний, ретельний
usually *adv* — зазвичай

Text 1A

Прочитайте і перекладіть текст.

Higher Education in Ukraine

Higher education plays an important part in the life of any country as it provides the country with highly-qualified specialists for future development and progress. It trains people to become teachers, engineers, doctors and other professional workers.

In all the industrial countries standards of living are steadily changing; this means that the kind of education, which was good enough thirty years ago, is not necessarily good for them today. The serious need to find ways and means of ensuring continuous and thorough adoption of the universities to contemporary needs in our rapidly changing world is widely recognized. And this means that styles of teaching, quality of learning materials[1] and organization of the university itself have to be continuously brought up to date[2] and improved.

Besides, knowledge and information which comes through the mass media must also be taken into consideration. This information explosion[3] has affected every field of study, especially, of course, in the natural and applied sciences and in all other sciences as well. The increase of information requires new methods and new approaches to students' training and instruction[4].

At present a new system of education is introduced in this country — a distance education system. This computer system of learning helps working professionals to continue their education while remaining at their jobs. This system enables people to get knowledge and a good foundation in the sciences basic to his or her field of study. Distance learning has developed over years[5]

from satellite video courses to modern videoconferencing through personal computers.

The academic year usually lasts 9 months and is divided into two terms (semesters). The first- and second-year students obtain thorough instructions in the fundamental sciences of mathematics, physics, chemistry and drawing as well as computer engineering and a number of others. The curricula are enriched and broadened[6] by instructions in such subjects as foreign languages, history and economics.

At the third year students get more advanced knowledge and begin to concentrate on their special interests, so to say, their «major» subject and take many courses in this subject. Specialized study and courses will help students to become specialists and prepare them for their future work.

After four years students will get a bachelor's degree. Then the students may go on with their studies and in a year or two of further study and research get a master's degree. After graduating from the university they may go on with their study and research and may get a still higher degree.

About 75 percent of students receive state grants and 15 percent are sponsored by enterprises. Universities have their own students' hostels and some of them have large and excellent sport centers.

Education is a process through which culture is preserved, knowledge and skills are developed, values are formed, and information is exchanged.

Education is the way to success.

Notes to the Text

1. learning materials — навчальний матеріал
2. to bring up to date — довести до сучасних умов
3. information explosion — інформаційний вибух
4. training and instruction — підготовка навчання
5. over years — за багато років
6. curricula are enriched and broadened — програми (курси навчання) збагачуються і поширюються

ВПРАВИ

Вправа 12. Продивіться вправу 7 і текст 1А, дайте відповіді на питання.

1. When does the academic year begin in this country? 2. How many exams did you pass to enter the University? 3. Do you pay for your education? 4. Do students get grants? 5. What subjects do students study in the first year? 6. Which subject is the most interesting for you? 7. Is there a sport center in your University? 8. What degree do students get after four years of study? 9. What

degree can a student get after two years of further study and research? 10. What new education system is introduced in this country? 11. What specialities do people get after graduating from a university? 12. Why is higher education important in the life of every country?

Вправа 13. Порівняйте речення в активному і пасивному стані, перекладіть їх.

1. Students asked the lecturer many questions. The lecturer was asked many questions. 2. The monitor told the first-year students to come to the laboratory. The first-year students were told to come to the laboratory. 3. Usually a lab assistant shows the equipment to the students. Usually the equipment is shown to the students by a lab assistant. Usually students are shown the equipment by a lab assistant. 4. Students watched the process with great attention. The process was watched with great attention. 5. Tomorrow our teacher will give us a new task. A new task will be given tomorrow. We shall be given a new task tomorrow. 6. Practice accompanies theory. Theory is accompanied by practice. 7. He asked me to bring a dictionary. He was asked to bring a dictionary. 8. The teacher told the students to sign their drawings. The students were told to sign their drawings. 9. The dean will send the students to a big plant in summer. The students will be sent to a big plant in summer. 10. He taught us to use the lab equipment. We were taught to use the lab equipment.

Вправа 14. А. Переробіть речення з активного в пасивний стан.

1. You open the door. 2. We asked questions. 3. He will finish his project next week. 4. He can do this exercise. 5. They invited me to their conference. 6. I saw a new film. 7. My sister writes letters regularly. 8. Universities develop new methods of students' training. 9. After graduating from the University the students may get a still higher degree. 10. The study of foreign languages, history and economics must improve the curricula of technological universities.

В. Перекладіть речення в пасивному стані, дайте варіанти, де можливо.

1. Mathematics, strength of materials, mechanics, elements of machines as well as engineering physics are studied at technological institutes. 2. The development of science is closely connected with the development of higher education. 3. Students are provided with hostels, well-equipped laboratories and libraries. 4. Any country must be provided with good specialists in all branches of science and technology for its further development. 5. Large sums of money are spent by the state to train highly-qualified engineers. 6. Much attention must be paid to improve the standards of higher education. 7. Students of

technological institutes are trained to analyse various facts and theories. 8. The scientific and technological progress of a country is determined by the qualification of specialists. 9. Some institutes of technology are reorganized into universities. 10.The country must be provided with specialists capable of working with the technology of tomorrow effectively.

ВПРАВИ ДЛЯ САМОСТІЙНОЇ РОБОТИ

Вправа 15. Визначте за суфіксом, до якої частини мови відносяться такі слова:

administration, gradual, electric, intensively, practical, dramatic, integral, specific, operation, illumination, naturally, identical, organization, originally, arctic, technical, acceleration.

Вправа 16. Знайдіть в тексті 1А слова с суфіксами *-tion*, *-al, -ic*, *-ly* і перекладіть їх.

Вправа 17. Знайдіть форми дієслова, що можуть бути присудками в реченні:

student, many, will be passed, doing, technical, has, reports, studied, interesting, connected, are, were done, large, is, tasks, developed, is read, coming, texts, badly, giving, had, was made possible, are given, forms, necessary, teaches, basis, was, done.

Вправа 18. Знайдіть:

а) антоніми

to begin, to enter, young, large, to open, to take, quick, much, to graduate from, many, long, slow, little, to finish, old, small, to close, to give, few, short;

б) синоніми

new, large, many, to begin, to take, to speak, to enter, to build, to do, to get, modern, big, to start, much, to make, main, to talk, to construct, to come into, major.

Вправа 19. Складіть речення з наведених нижче слів згідно з порядком слів в англійському реченні.

1. has, buildings, our, several, institute. 2. subjects, students, many, the first-year, study. 3. the third-year, had, last, students, training, industrial, summer. 4. carry out, students, practical, work, in, laboratories, well-equipped.

5. problems, many, scientists, important, solve, our. 6. texts, difficult, Pylypenko, technical, translated. 7. his, will, the teacher, translation, correct. 8. next, dean, a lecture, deliver, our, week, will. 9. students, more, institutes, last, entered, a million, than, year.

Вправа 20. Заповніть пропуски дієсловами *to be, to have* в відповідному часі.

1. Our University ... one of the oldest technological institutes in this country. 2. It... founded in 1830. 3. It... old and new buildings. 4. There ... laboratories, workshops and libraries in our institute. 5. Every faculty ... its own computer center. 6. Our library ... a great number of books and magazines in all branches of science and technology. 7. Last year we ... at school, next year we ... the second year students. 8. We ... industrial training in the third year.

Вправа 21. Виберіть правильну форму.

1. Entrance exams (held, are held) in summer. .2. More than 20 new technological institutes (were founded, founded) in the last decade. 3. Basic engineering subjects (studied, are studied) in the first and second years. 4. Highly-qualified specialists (trained, are trained) at higher schools. 5. More than a million students (enroled, were enroled) to the institutes and universities of this country last summer. 6. The training of specialists (will be improved, will improve) as a result of restructuring in the next few years.

Вправа 22. Напишіть відповіді на питання згідно зі зразком:

Are there two presidents in the United States? No, there are not. There are not two presidents in the United States. There is one president in the United States.

1. Are there thirteen months in a year? 2. Are there eight days in a week? 3. Are there fifty minutes in a hour? 4. Are there seventy seconds in a minute? 5. Are there forty days in a month? 6. Are there thirty days in February? 7. Are there thirty-two days in January? 8. Are there five seasons in a year?

Вправа 23. Виберіть відповідні займенники.

A. 1. (We, us) all went with (their, them) to the dean's office. 2. My friend came to see (I, me) last night. 3. Victor gave Peter and (I, me) a book and we went to the reading-room with (he, him) and his friend. 4. He told Mary and (me, I) to go with (he, him) and his sister. 5. They know all about my friend and (I, me). 6. I came to the Institute with Michael and (her, she). 7. An old man

asked (we, us) to come and see (him, his). 8. Go with David and (her, she) to visit (they, them).

B. They invited me to (them, their) party. 2. He could not answer (his, her) teacher. 3. They were (your, you) former students. 4. You are (us, our) colleagues. 5. This is (my, me) brother. 6. Ann went to (his, her) room and put on (his, her) new dress because she was going to a dance given by (his, her) company. 7. Where is the dictionary? (He, it) is in (his, its) place on the table.

C. 1. Your dictionary is new, but (my, mine) is not. 2. She says that this dictionary is (her, hers). 3. You can do it without my help, but not without (theirs, their). 4. Will you help me to sort out the things? I cannot tell which are (your, yours) and which are (our, ours). 5. He is an old friend of (me, mine). 6. Do you know your lesson today? He does not know (him, his). 7. This is your notebook and this is his, but where is (her, hers)?

Вправа 24. Викажіть згоду або незгоду.

1. Do you study at school? 2. Are you a student of the third year? 3. Do you study many subjects? 4. Did you pass your entrance exams well? 5. Do you live in Moscow? 6. Do you live far from the institute? 7. Is English your favourite subject? 8. Will you go to the concert tomorrow? 9. Were your books taken from the library? 10. Do you live in the hostel?

Вправа 25. Заповніть пропуски прийменниками *in, at, on, to, into, under.*

1. We live ... Vinnitsya. 2. I get up ... seven o'clock and leave ... eight. 3. I usually walk ... the institute. 4. There are three rooms ... our flat. 5. There is a picture ... the wall and a small table ... the picture. 6. He comes ... the room and sits down ... the chair ... the table. 7. ... the evening we watch TV or read books. 8. We do not study... Sunday. 9. There are several newspapers ... the table. 10. The accident happened ... the bridge.

Вправа 26. Прочитайте та перекладіть текст без словника.

As you know higher education trains highly-qualified specialists for further development and progress of the country. The students making good progress get state grants. The course of study at the universities lasts about six years. The students take three or four years of general engineering and fundamental courses, then one or two years of specialized training in some fields of science and technology. In the first and second years a good foundation for professional knowledge is provided. At present there are many modern laboratories at institutes. Most higher schools have their own computer centers. This means that the state must spend a lot of money to improve higher education.

CONVERSATION

Exercise 1. Answer the questions.

1. How old are you now? 2. Where were you born? 3. What city did you come from? 4. Where did you go to school? 5. What foreign language did you study at school? 6. How long did you study at school? 7. Why did you enter this institute? 8. What are your favourite subjects at the institute? 9. Where do you live? 10. Do you live with your family? 11. How do you usually spend your Saturday and Sunday? 12. What did you do last weekend? 13. What are you going to do next weekend? 14. What is your favourite sport? 15. What is your hobby? 16. Where do you usually spend your summer vacation? 17. When do you usually get up in the morning? 18. At what time do you usually leave home? 19. How do you usually get to the institute?

Exercise 2. Read and learn.

Ted's instructor: Hello Ted. I'm glad I saw you before lectures. Did you know about the change in the examination timetable?

Ted: Change?

Ted's ins.: Yes. The last day of examinations for your group will be January 23rd not January 21st.

Ted: Is that definite (определенно, точно)? We were told they'd be on January 22nd.

Ted's ins.: There can be no changes now. It's definitely January 23rd.

Ted: That's great. I'm going to London on holiday on January 24th.

Ted's ins.: Have you finished your assignment (домашнее задание) yet?

Ted: I'm nearly there. I think I'll give it to you on Tuesday.

Ted's ins.: That's good. I can't let you have another extension (відстрочка).

Ted: I was really grateful for the extra time you gave me. That was a really big assignment. Ted's ins.: Well, I'll expect it next week. Now, would you like to hear the details of the schedule?

Ted: Oh. Yes, please.

Ted's ins.: You'll have four examinations. General mechanics is in the morning of January 8th, physics is on the afternoon of January 13th, maths is on the morning of January 18th, and information technology in the afternoon of January 23rd.

Mr.R.: Good morning. Have a seat.

Bob: Good morning. Thank you.

Mr. R.: I have your application here. Your name is Robert Smith, right?

B.: That's right, sir.

Mr. R.: And you hope to enter our university this year?

B.: Yes sir, if I can make it.

Mr. R.: Fine, Bob. You finished school a year ago. Why didn't you enter college that year?

B.: Well, I have a sister in college now. And there is another one who'll be going next year. So I need money to pay for my education.

Mr. R.: All right. How were your grades (оцінка) at school?

B.: Well, pretty good. Until my last year I got a little too in-

terested in sports. But I know I'll work hard in college.

Mr. R.: It's hard to keep up both sports and studies.

B.: Yes sir, I know.

Mr. R.: Fine. Well, we'll let you know in about two weeks, good luck (вдачі).

B.: Thank you, sir. Goodbye.

Text 1B

Прочитайте текст. Розкажіть про особливості навчання в Кембриджському університеті.

Cambridge

Cambridge is one of the two main universities of England which is located at the Cam River. It was founded at the beginning of the 12th century. The University consists of (складається з) 24 different colleges including 4 colleges for women. Each college is self-governing (самокерується).

The head of the University is the chancelor who is elected for life. The teachers are commonly called «dons» and «tutors». Part of the teaching is by means of lectures organized by the University. Besides lectures teaching is carried out by tutorial system for which Cambridge University is famous all over the world. This is a system of individual tuition (навчання) organized by the colleges.

Each student has a tutor who practically guides him through the whole course of studies. The tutor plans the student's work and once a week the student goes to his tutor to discuss his work with him. The training course lasts 4 years. The academic year is divided into 3 terms. The students study natural and technical sciences, law, history, languages, geography and many other subjects.

After three years of study a student may proceed (отримати вчену ступінь) to a Bachelor's degree, and later to the degrees of Master and Doctor. Students are required to wear gowns (мантія) at lectures, in the University library, in the street in the evening, for dinners in the colleges and for official visits. All the students must pay for their education, examinations, books, laboratories, university hostel, the use of libraries, etc. Very few students get grants. Not many children from the working class families are able to get higher

education, as the cost is high. The cost of education depends on the college and speciality.

A number of great men, well-known scientists and writers studied at Cambridge. Among them are: Erasmus, the great Dutch scholar, Bacon, the philosopher, Milton and Byron, the poets, Cromwell, the soldier, Newton and Darwin, the scientists.

Text 1C

Прочитайте текст. Розкажіть про особливості системи вищої освіти в нашій країні і в США.

Higher Education in the USA

There is no national system of higher education in the United States. Higher education is given in colleges and universities. There are over 2100 various higher educational institutions, including colleges, technological institutes and universities. The average college course of study is 4 years. The academic year is usually 9 months or 2 terms (semesters) of four and a half months each. Classes usually begin in September and end in June. The first-year students are called freshmen. Students choose a major subject (профілюючий предмет, дісципліна) and take many courses in this subject. After four years, they get a traditional Bachelor's degree. Then the students may go on to graduate school (старші курси) and with a year or two of further study get a Master's degree.

After another year or two of study and research, they may get a still higher degree as Doctor of Philosophy (Ph. D.). The student's progress is evaluated by means of tests, term works and final examinations in each course. The student's work is given a mark, usually on a five point scale (5-ти бальна система). Letters indicate the level of achievement. «A» is the highest mark. «F» denotes a failure.

Most American colleges and universities charge for tuition. The methods of instruction in the universities are lectures, discussions, laboratory and course works and seminars.

Most cities have colleges or universities that hold classes at night as well as in daytime. In this way people may work for a degree or just take a course in the subject that interests them.

LESSON 2

Часи групи *Continuous Active, Passive*
Функції *it, one, that*
Ступені порівняння прикметників
Суфікси *-ment, -ty, -ous*
Префікс *re-*
Text 2A. *Environment Protection must be Global*
Text 2B. *Pollution*
Text 2C. *Ecological Problems of Big Cities*
Text 2D. *London, its History and Development*

Вправа 1. Поясніть вживання часів групи Continuous, перекладіть речення.

A. 1. I am at my English lesson. I am sitting and doing my exercises. My friend is not sitting, he is standing at the blackboard and looking at me. 2. It is getting cold now, isn't it? Look out. Is it raining now? 3. You are late. What were you doing? — I was translating a text. 4. When I came home my parents were having supper and at the same time they were watching TV. 5. What was he doing when I rang up an hour ago? He was looking through a newspaper when I rang up. 6. Tomorrow we shall be preparing for a test for the whole evening. 7. In July they will be taking their exams for the whole month. 8. What will you be doing tonight at 10 o'clock? Will you be working? No, I shall be reading a book at this hour.

B. 1. New Metro lines are being built now in Kyiv. 2. What is going on? A new film is being discussed. 3. What grammar was being explained when you came in? 4. What questions were being discussed at that time? 5. New methods of research are being used in our lab. 6. Much is being done to improve laboratory methods.

Вправа 2. Виберіть правильну форму дієслова.

1. We (are translating, translate) a technical text now. 2. We usually (are not translating, do not translate) stories. 3. She (does not look, is not looking) through all the newspapers every evening. 4. He (looked, was looking) through a newspaper when the telephone rang. 5. What (were, was) you doing a minute ago? I (was watching, watched) television. 6.1 (watch, am watching) television every day. 7. I had a late night, I (worked, was working) until midnight. 8.Yesterday he (worked, was working) a lot. 9. The students (had, were having) an interesting discussion when the teacher came in. 10. The students often (have, are having) interesting discussions after lectures. 11. When he comes they (will

be taking, will take) a test. 12. They (will be taking, will take) a test next week. 13. Where is Ann? She is in the coffee shop. She (has, is having) a cup of coffee. She always (has, is having) a cup of coffee in the evening.

Вправа 3. Поставте дієслово в відповідному часі, зважаючи на обставину.

This student (study) physics (at present, every day, last semester, when the telephone rang, tomorrow at this time, next semester).

Вправа 4. Перекладіть речення.

1. Зараз у нас урок англійської мови. Викладач стоїть біля дошки і пояснює нову граматику. Студенти уважно слухають і записують. 2. Де ви були вчора після обіду? Я був вдома весь день. Я писав листа друзям. 3. Що ти робив п'ять хвилин тому? 4.На нашій вулиці трапився нещасний випадок (accident). Я дивився у вікно, коли він трапився. 5. Що буде робити твоя сестра о 8 годині вечора? Вона буде виконувати домашнє завдання. 6. Які питання будуть обговорюватися сьогодні на зборах? — Приходьте о 12 годині. Буде обговорюватися дуже цікаве питання. 7. Коли ми приїхали до міста, там будувався новий спортклуб.

Вправа 5. Перекладіть речення з *it* в різних функціях.

1. It is autumn. It is the 3rd of October. It is dark in the morning and it is difficult to get up. 2. It is a new subject. It is very important for our future speciality. We shall study it for two years. It will be our future speciality, but we do not know much about it in the first year. 3. It is known that the knowledge of general engineering subjects is the basis for the study of special subjects. 4. It seems that he works a lot. 5. It is said that the chemistry laboratory of our institute is good. 6. The student finds it difficult to translate such a text without a dictionary. 7. It was not easy to study at the institute. 8. It is important to understand the fundamentals of this science. 9. It was A.S. Popov who invented the radio. 10. It is the knowledge of general engineering subjects that is the basis of engineering training.

Вправа 6. Перекладіть речення з *one* в різних функціях.

1. One must study a lot to become an engineer. 2. We must write only one exercise now. 3. Engineer is one of the most important professions, it is the one that is taught at technical institutes. 4. One cannot translate such an article without a dictionary in the first year. 5. One must have a very good knowledge of general engineering subjects to become a good engineer. 6. One must pass all

exams well to enter an institute. 7. Last summer I read many English articles, and my friend read some German ones. 8. This summer we shall spend in the country, the last one we spent in the city. 9. We translated many texts, but there is one more text to translate. 10. One can take this journal from the library.

Вправа 7. Перекладіть речення з *that* в різних функціях.

1. That student studies in our group. 2. Do you know those girls? They are from our institute. 3. The professor that lectures on mechanics is the dean of our faculty. 4. It is known that the knowledge of general engineering subjects is the basis for the study of special subjects. 5. We know that the study of general engineering subjects is necessary for future engineers. 6. That higher education in this country is excellent is known to everybody. 7. The aim of today's foreign policy is that peace in the world should be permanent. 8. The programme for the first-year students differs from that of the third-year students. 9. There are many interesting articles in this journal, read those on your speciality. 10. It is the high qualification of future specialists that will determine the scientific and technological progress of any country.

Вправа 8. Дайте ступені порівняння, яких не вистачає.

(the) biggest, longer, faster, (the) hardest, (the) heaviest, thinner, narrower, lower, (the) greatest, newer, colder, (the) hottest, (the) shortest, less, (the) worst, more.

Вправа 9. Поставте прикметники в порівняльному або найвищому ступені.

1. This student is (clever) student in our group. 2. Strength of materials is (difficult) than chemistry. 3. Is it (interesting) to study at the institute than at school? 4. My friend works (hard) at his English than I. 5. My brother is (old) than I but he is (short). 6. The University is one of the (tall) buildings in Vinnitsya. 7. Days in summer are (long) than in winter. 8. This group studies (good) than that one. 9. Oxford is (old) University in Britain.

Вправа 10. Дайте відповіді на подані нижче запитання.

1. Which is the most difficult subject for you? 2. Which is the easiest subject? 3. Which of the subjects is more difficult: physics or mathematics? 4. Who is the tallest in your group? 5. Which is the most interesting subject for you? 6. Is English as difficult as mathematics?

Вправа 11. Заповніть пропуски словами *than, as ... as, not so ... as.*

1. In winter days are ... long ... in summer. 2. Chemistry is... difficult ... physics. 3. I study English ... long ... my friend. 4. My sister is older ... I. 5. English is ... so difficult ... mathematics. 6. Kyiv is bigger ... Tallinn. 7. This machine is ... old ... that one. 8. The new transistor is more powerful... the old one. 9. The task of school education is ... important... that of higher education. 10. John is ... tall ... his brother, but he is ... tall ... his father.

Вправа 12. Перекладіть звороти в порівняльному ступені відповідно до зразка:

The longer the nights, the shorter the days.
Чим довші ночі, тим коротші дні.

1. The harder we study, the more we know. 2. The more you work, the better you know English. 3. The more we study nature, the more we know about it. 4. The nearer the earth is, the denser the atmosphere is. 5; The stronger the wind, the harder the conditions of work for weather observers. 6. The quicker we finish, the sooner we will go home.

Вправа 13. Знайдіть в кожному рядку прикметники в порівняльному ступені і перекладіть їх.

teacher, taller, thermometer, thinker
worker, weather, worse, writer
bomber, brother, brighter, barometer
darker, driver, denser, dancer
bigger, best, builder, better
father, farther, foreigner, faster
earlier, easier, eater, engineer
compressor, computer, colder, closer
meter, mover, more, motor

СЛОВОТВОРЕННЯ

Вправа 14. Перекладіть наведені нижче похідні слова за зразком:

дієслово + -ment = іменник
to environ —оточувати → *environment — оточення*

to enrol — enrolment, to develop — development, to achieve — achievement, to move — movement;

*прикметник + **-(i)ty** = іменник*

***social** — суспільний → **society** — суспільство*

active — activity, special — speciality, national — nationality, intensive — intensity, electric — electricity;

*іменник + **-ous** =прикметник*

***fame** — слава, відомість → **famous** — відомий, славний*

variety — various, number - numerous; monotony — monotonious;

*префікс **re-** (повторність дії)*

***renew** — поновити, обновити*

***renewal** — відновлення*

***renewable** — той, що відновлюється*

rebuild, remake, reuse, reorganize, reorganization.

Вправа 15. Прочитайте та перекладіть інтернаціональні слова:

global ['glqubl], resources[rI'sLsIz], problem['prOblqm], ecology [I'kOlqGI], roportion [prq'pLSqn], era ['Iqrq], territory ['terItqrI], ocean ['quSqn], oceanic [,quSI'xnIk], situation [,sItju'eISqn], atmosphere ['xtmqsfIq], process ['prquses], climate ['klaImIt], balance ['bxlqns], experiment [Iks'perImqnt], social ['squSql].

Вправа 16. Прочитайте та запам’ятайте вимову слів.

environment [In'vaIqrqnmqnt], pollution [pq'lu:Sqn], achieve [q'C:v], success [sqk'ses], successful [sqk'sesfql], successfully [sqk'sesfulI], purify ['pjuqIfaI], air [Fq], natural ['nxCrql], however [hau'evq], job [cGOb], remain [rI'meIn], mankind [mxn'kaInd], reach [ri:C], special ['speSql], especially [Is'peSqlI], serious ['sIqrIqs], throughout [Tru'aut], world [wWld], knowledge ['nOlIG], advance [qd'vQ:ns], eliminate [I'lImIneIt], purpos ['pq:pqs], scale [skeIl], weather ['weDq], essential [I'senSql] therefore ['DFqfL], data ['deItq], joint [cGOInt], measure ['meZq], realize ['rIqlaIz], circumstance ['sWkqmstqns].

СЛОВА І СЛОВОСПОЛУЧЕННЯ ДЛЯ ЗАПАМ’ЯТОВУВАННЯ

achieve *v* — досягати
advance *n* — просування вперед, успіх, прогрес
area *n* — область
bring about *v* — викликати
carry out *v* — виконувати, здійснювати
change *v* — міняти, змінювати; *n* – зміна, переміна
considerable *a* — значний
deal with *v* — мати справу з
effort *n* — зусилля
evident *a* — очевидний
growth *n* — ріст

however *adv* — однак, проте
increase *v* — збільшувати
level *n* — рівень
purpose *n* — ціль, призначення
reach v — досягати
realize *v* — розуміти, чітко уявляти
remain *v* — залишатися
scale *n* — масштаб, розмір
several *a* — декілька
similar *a* — подібний, схожий
solve *v* — вирішувати
still *adv* — все ще, однак
success *n* — успіх
therefore *adv* — тому
way *n* — шлях, дорога; засіб

joint efforts — спільні зусилля
take measures — вживати заходів
throughout the world — в усьому світі

Text 2A

Прочитайте та перекладіть текст.

Environment Protection Must Be Global

That the problem of pollution and ecology has become the most important one for mankind is evident to all. The more civilization is developing, the greater the ecological problems are becoming. Air and water pollution by industry is now reaching tremendous proportions. In our era it is changing from a national to an international problem, especially in territories where rivers cross several countries. The seas and oceans are also becoming seriously polluted. A similar situation is developing in the atmosphere. It is known that many cities throughout the world suffer from air pollution.

However, our scientific knowledge and technological advancement make it possible to eliminate it if people use good will[1] and make considerable investments for that purpose. The development of natural resources on a global scale is already possible from a scientific and technical standpoint[2]. Large-scale experimental work in this area is successfully being carried out.

At present scientists in industrially developed countries are working on the theory of interaction of all the atmospheric and oceanic global processes that determine the climate and weather of the world. Increasing growth of population, industrialization and the use of resources are slowly but surely changing the global climate and water balance. This can be described as a great experiment, one that may bring about changes in the environment more serious than ever before.

The essential feature in the environment protection is that many problems can be solved only on the level of world community[3]. Therefore, the planning of protection against pollution by human society as a whole[4] is imperative today and in the near future. It is necessary to develop an international program to

study data on land, forest, atmospheric and oceanic resources, both renewable and non-renewable. It is the joint efforts of many scientists and special public organizations that can deal with the problem and take necessary measures to protect the environment.

It is still a big job and much remains to be done[5]. However, scientists are confident that planned actions of all countries can eliminate pollution and achieve successes in purifying air, water and soil and in safeguarding natural resources. At the same time one must realize that social and political circumstances may stand in the way of further progress in this field.

Notes to the Text

1. good will — добра воля
2. standpoint — точка зору
3. community — спільнота
4. as a whole — в цілому
5. much remains to be done — ще багато залишається зробити

ВПРАВИ

Вправа 17. Прогляньте текст 2А і дайте відповіді на питання.

1. What is this text about? 2. What is ecology? 3. How does water (air) become polluted? 4. Why is the problem of water pollution becoming a global problem?

Вправа 18. Знайдіть речення з дієсловом-присудком в Present Continuous, перекладіть.

1. Water and air are becoming more and more polluted. 2. At present computers are more widely used in the sphere of education. 3. Where were you at six o'clock? We were studying in the reading-room. 4. There are government and public organizations that are analysing data on land, forest and air. 5. New courses of education such as management are being organized in many institutes. 6. What will you be doing in the laboratory tomorrow morning? We shall be watching the operation of a new device. 7. Measures are being taken to save Lake Baikal. 8. The situation at Lake Baikal is remaining very serious. 9. Much attention is being paid at present to the development of international scientific contacts. 10. Science is becoming a leading factor in the progress of mankind.

Вправа 19. А. Знайдіть речення з дієсловом-присудком в Continuous Passive, перекладіть.

1. Cambridge University was formed in the 12th century. 2. The solution of ecological problems may be achieved only by joint efforts of all countries. 3. Great changes in people's lives and work were brought about by the scientific and technological progress. 4. The theory of interaction of atmospheric and oceanic processes is being developed to determine the weather of the planet. 5. The teachers at Cambridge are called «dons» or «tutors». 6. Computers and lasers are being widely introduced at plants and factories. 7. The most important ecological problems must be considered at the government level. 8. The training at Cambridge and Oxford is carried out by tutorial system.

В. Переробіть речення з активного в пасивний стан.

1. He is writing a letter at the moment. 2. John was preparing report all day yesterday. 3. We are learning grammar now. 4. At present mankind is making considerable investments to eliminate air pollution. 5. Today the changes in the global climate and water balance are bringing about serious changes in the environment. 6. Many scientists are constantly carrying out experimental work to solve the problem of environment protection. 7. The company is making plans for the future.

Вправа 20. Знайдіть речення, де *it* є формальним підметом, особовим займенником або входить до складу підсилювальної конструкції; перекладіть.

1. It is dark here. Please, turn on the light. 2. It was Gagarin who was the first man to orbit the Earth. 3. Our students study strength of materials. It is a very difficult subject. 4. Mathematics is studied at all technological institutes because every engineer must know it well. 5. It is the most interesting article on this subject. 6. It has become evident that ecological problems can be solved only on the global level. 7. Joint efforts of people throughout the world make it possible to achieve some progress in environment protection. 8. It is the development of robots that will solve some very complex problems of industry. 9. It is evident that research is becoming more specialized now. 10. The use of the new equipment made it possible to minimize the number of workers. 11. It is industrialization that is making ecological problems very serious.

Вправа 21. Визначте функції *one* і *that,* перекладіть речення.

1. The problem that has become the most important one is the problem of pollution. 2. One can easily understand why the profession of an engineer

requires a special college training 3. The new technologies that are being developed must be connected with traditional ones. 4. That air and water pollution by industrialization is reaching dangerous levels is realized by everyone. 5. It is the invention of an engine that started the first industrial revolution. 6. The main purpose of education is that graduates must be able to work with the technology of tomorrow. 7. The education in Oxford and Cambridge is different in many ways from that in other universities. 8. We discussed the first industrial revolution, the one that took place some centuries ago. 9. New robots will have several manipulators that will carry out many functions. 10. That computers and robots are important for industrial uses is well known to scientists and engineers. 11. One must realize that the increasing number of cars brings about considerable pollution of the air. 12. It is the growth of industrialization that is changing the climate of the planet. 13. The essential feature of higher education in this country is that it combines theory with practice. 14. The simplest materials are those which have only one kind of atoms. 15. That the Earth is round was unknown for a long time. 16. It is found that the labour (праця) of a man with secondary education is 108 per cent more efficient than that of a man without that education. Moreover, the work of a university or college graduate is 300 per cent more efficient than that of a specialist with secondary education.

Вправа 22. Перекладіть речення з сполучниками порівняння.

1. The bigger the cities are, the greater the pollution is. 2. The more computers and robots are used in industry, the quicker technological progress will be. 3. The more automobiles appear in the streets, the worse the air in the cities is. 4. The more effective is the technology, the quicker is the development of this country. 5. The quicker we joint our efforts in protecting the environment, the quicker the ecological problems are solved.

ВПРАВИ ДЛЯ САМОСТІЙНОЇ РОБОТИ

Вправа 23. Визначте за суфіксом до якої частини мови відносяться слова.

radioactivity, measurement, interaction, society, nervous, elimination, basic, proportion, seriously, symbolic, anxious, ecological.

Вправа 24. Перекладіть слова з суфіксом *re-*.

rename, reopen, renew, renewable, non-renewable, renewal.

Вправа 25. Знайдіть серед наведених нижче слів:

а) антоніми
slowly, old, at present, small, quickly, in the past, new, large;

б) синоніми
tremendous, epoch, realize, several, work, progress, great, field, era, understand, make it possible, different, achieve, some, advance, enable, area, various, reach, essential, job, important.

Вправа 26. Складіть речення, використовуючи слова і вирази з таблиці.

Her friend	are watching	a letter
They	is writing	on the telephone
I	are listening to	the latest news on the radio
You	am reading	the TV programme
We	is speaking	an exercise

Вправа 27. Розкрийте дужки.

A. When Peter was a child, he had two drawing books. One of them was (large) than the other. His elder brother bought the (large) one for him. Peter liked it (well) because the drawings in it were (large) and simple. He drew something every day. Each new day his drawing was (good) than the one he had made the day before. The last page was much (good) than the first one.

B. After graduating from the institute Mike went to a small industrial town. It was (difficult) for him to begin his work as an engineer than he thought that it would be. He moved to (important) city than the first one. He was not (successful) there than before, however, and sometimes he was even (unhappy). However, he was (happy) about one thing, he was becoming a (useful) specialist.

C. New York is the (large) city in the US. Perhaps, with all its suburbs (пригород), it is the (large) city in the world. It is one of the (important) industrial cities in the country. Some of the (old) and historic buildings are there. Some of the buildings in New York City are the (high) buildings in the whole world. New York City is not only the (large) city in the US; it is also the (important) industrial center. Perhaps, the (expensive) office buildings in the world are there. It has the (great) number of factories, the (large) banks and post offices. It sends out many letters and receives the (heavy) mail bags. It is truly the (important) business city.

Вправа 28. Перекладіть текст.

The highest mountain in the world is Mount Everest — 29,002 feet high. The largest ocean is the Pacific having a total area of 63,986,000 square miles. The Atlantic Ocean, the next largest, is only 31,530,000 square miles, the Indian Ocean with 28,350,000 square miles comes third. The longest river is the Nile which is more than 4,000 miles longer or about twice the distance by air from London to Beirut. The biggest island is Greenland which belongs to Denmark and is about 840,000 square miles in extent. The largest lake is the Caspian Sea. Geographers consider it as a lake because it is not connected with any of the great oceans. It has an area of about 170,000 square miles. Which is the deepest sea? So far, as we know at present the greatest depth is in the Pacific Ocean near the Philippines and goes down to 37,000 feet, which is much more than the height of Everest. The biggest volcano is in Ecuador, South America. It is still active and 19,612 feet high. There is another one between Argentina and Chile and it is more than 3,000 feet higher.

Вправа 29. Напишіть іменники в однині.

cities, countries, societies, universities, technologies, lorries, industries, dictionaries, territories, theories, communities.

CONVERSATION

Exercise 1. Answer the questions according to the example:

What is one of the most important problems for mankind now? (the problem of pollution and ecology).

The problem of pollution and ecology is one of the most important problems for mankind now.

1. What problem is becoming a global problem? (the problem of air and water pollution). 2. What makes it possible to eliminate air and water pollution? (scientific knowledge and technological advance, good will and large investments). 3. What are scientists in industrially developed countries currently working on? (the theory of interaction of the atmospheric and oceanic global processes). 4. What factors are slowly changing the global climate and water balance? (the growth of population, industrialization and use of resources). 5. What actions are necessary to take to deal successfully with the problem of protecting the environment throughout the world? (planning, developing international programs to study ecological data, joint efforts of scientists and special public organizations).

Exercise 2. Make a sentence out of the two parts.

1. At present one of the most important problems for mankind	6. Large-scale experiments in this area
2. The rivers, seas and oceans	
1. are becoming seriously polluted by industry.	3. it is possible to eliminate air and water pollution by planned actions of human society as a whole.
2. are successfully being carried out on a global scale.	4. is evident to all.
3. That purifying air, water and soil is changing from a national to a global problem	5. to take measures to safeguard natural resources and the environment on a global scale.
4. Therefore, it is necessary	6. is that air and water pollution is reaching very large proportions.
5. Scientists expect that	

Exercise 3. Read and learn.

Rita: Did you have a nice weekend?

Mary: Yes, I did. I was tired of watching television, going to parties, to the movies and so on. John and I decided to go to Pennsylvania University to take part in the discussion on environmental problems:

R.: Oh, really! How unusual! That must have been interesting.

M.: Yes, it was. There were a lot of scientists and politicians. Have you heard about such a firm called «Sanyo»?

R.: Certainly. It is well known for its electronics.

M.: It's one of the first companies to make products that don't pollute the environment.

R.: Oh, my father told us about new heating systems made by this company. They use clean and safe technology.

Text 2 B

Pollution

The British, like many other Europeans, are becoming more and more worried (турбуватися) about their environment. Here are some of the environmental problems that they face.

As the population of large cities like London, Birmingham and Manchester continues to grow, pollution problems become worse.

The air in many towns and cities is being polluted by traffic (транспорт) and industry. The number of cars and lorries is growing all the time. On the one

hand, they bring mobility to millions of people, but on the other hand, they need bigger, better and more expensive roads, which often ruin the countryside (сільська місцевість). Traffic in cities is getting worse and worse. Water pollution has become a serious problem in many British rivers. People living near airports suffer from the noise of increasingly larger and more powerful jet airliners taking off and landing.

Text 2C

Ecological Problems of Big Cities

There are over 150 supercities in the world with population from one to 15 million and more. Tokyo, New York, London, Mexico City, Rio de Janeiro and Moscow are just a few of the cities which have become supercities.

People in the supercities suffer from polluted environment: bad water, bad air and noise. A new term, urban (міський) climate, is used now for such cities. It means high temperature, oppressive atmosphere and intensive smog.

Some experts consider that it is practically impossible to protect the big cities from pollution. The World Health Organization (WHO) studied air pollution around the world for over eight years.

It measured two things: the level of sulphur dioxide (SO_2) in the air and the level of smoke. Sulphur dioxide and smoke pollute water and have serious effect on forest, buildings and health of people. In the WHO report it is shown that the cities with the most considerable level of CO_2 in the air are Milan, Teheran, Prague, Santiago and San Paulo. However, some cities with clean air get worse in winter. Helsinki, for example, becomes one of the cities with the largest proportion of it in the air in winter. This must be connected with the heating of houses. One can also mention (нагадувати) Glasgow and Warsaw which suffer in the same way.

Text 2D

Прочитайте текст. Розкажіть англійською мовою про визначні місця Лондона.

London, its History and Development

It is known that the area around London was inhabited (населяти) by the Celts. Later the Romans founded a military camp there. The camp developed into a port. The area of about 1 square mile where the Romans built their fortifications corresponds approximately to today present City of London. London was the capital of one of the Roman provinces of Britain. After the Romans left Britain, London became less important and suffered greatly from

the Danes and Vikings. It was under Henry the First in the 12th century that London finally became the capital of England. In the 16th century London, with its 500,000 inhabitants, was the largest city in England. Under Queen Elizabeth the First in the 17th century England dominated the oceans and became the Empire. It is in the Elizabethan Age that art, culture and literature flowered, especially in London. Over the centuries London became the centre of a constantly growing empire. The empire reached its apex (вершина) under Queen Victoria. Industrialization and the expansion of international trade brought London power, growth and cultural and economic development. In the First and Second World Wars London was ruined considerably.

Some 9 million people now live in London and its suburbs, and the city covers an area of 620 square miles, making it one of the largest of the world's capitals. One reason for its size is that the English people like to live in small houses and have small gardens. As a result, less than 5,000 people live in the City of London, while more than half a million come here to work in the daytime. Today London is the capital of Great Britain and is also the seat of the Royal Family, the Parliament, the major administrative bodies and scientific institutions.

The Houses of Parliament stand on the bank of the Thames at Westminster Abbey. Actually it is one building but it is called «Houses» as it consists of two chambers: the House of Lords and the House of Commons. It was set up in the 13-th century. At one end of the Houses of Parliament there is a tower with a large clock. The largest bell, known as Big Ben, chimes in (дзвонити кожну годину) the hour.

Westminster Abbey was a monastery built in the 8th, century. It is one of the best examples of the Early English architecture. The kings and queens of England are buried there. Many great statesmen, writers and poets are also buried there.

In the centre of London there is one of the most beautiful squares — Trafalgar Square which was named so to commemorate (на честь) Nelson's victory in the battle of Trafalgar. There is the monument in its centre known as Nelson's Column.

In the vicinity of Trafalgar Square is Whitehall which is now a street of government offices. Not far from Whitehall is Downing Street. Number 10 Downing Street is the residence of the Prime Minister of England. The Cabinet meets there. One must mention the British Museum. It is one of the most extensive and valuable museums in West Europe, It was founded in 1753. It also comprises the National Library. There are other numerous museums and galleries displaying interesting finds from all parts of the world and from all stages in the development of nature, man and art. There are also two large opera houses, the National Theatre and 50 other theatres. Monuments of past greatness are everywhere in London.

LESSON 3

Часи групи *Perfect Active, Passive*
Підмет, присудок
Суфікси *-er/-or, -ant/-ent*
Префікси *un-/im-*
Text 3A. *Electricity*
Text 3B. *A Great Citizen of the World*
Text 3C. *Solar Light by Night*
Text 3D. *Non-traditional Renewable Sources of Energy*

Вправа 1. Поясніть вживання часів групи Perfect, перекладіть.

1. This is a very good book, I have just read it with pleasure. 2. He has been absent this week. He has been ill. 3.1 haven't seen you for a long time. Where have you been all this time? 4. We haven't heard about her since 1989. 5. By the beginning of the lecture the laboratory assistant had brought all the necessary diagrams. 6. Before we came to the next lecture we had studied the material of the first one. 7. Have you already finished your diploma work? No, I shall have finished it by the end of June. 8. They will not have passed their exams by the time you return. 9. Many students have been enroled into universities this year. 10. The translation has not been finished yet. It will have been finished by the end of the month. 11. Have you brought these journals with you? No, these journals had been brought by my sister before I returned from St.Petersburg. Don't you know that?

Вправа 2. А. Виберіть правильну форму.

1. He (has graduated, graduated) from technical university this year. He (graduated, will have graduated) from technical university in 6 years. 2. She (saw, has seen) us in the morning yesterday. She (saw, has seen) us this morning. 3. I (have met, met) him last year. I never (had met, have met) him before. 4. Our group (will do, will have done) a lab work tomorrow. 5. This problem (is discussed, has been discussed) much in the press lately. This problem (was discussed, had been discussed) yesterday.

В. Перекладіть і поясніть вживання часів.

1. The students have done their homework very well. 2. Bob has left his notebook at home. 3.1 have told you about a lecture. 4. The laboratory assistant had prepared the experiment by 2 o'clock. 5. She had finished her test when we

came. 6. The teacher will have corrected our dictation by the end of the week. 7. They have not made any mistakes.

Вправа 3. Перекладіть речення.

1. Що ви зробили сьогодні? - Я надрукувала (to type) багато листів. - Я хочу подивитися лист до містера Д. - Ось, будь ласка. Я тільки-но надрукувала його. - А лист до містера Р.? - Я ще не надрукувала цей лист. Я надрукую його до кінця робочого дня. 2. Вчора ми зустріли наших друзів. Ми не бачили їх від закінчення університету. Перед тим, як повернутись до Києва, вони працювали у Донецьку. 3. Новий завод побудують до початку наступного року. Його обладнають найсучаснішою апаратурою.

Вправа 4. Прочитайте і поясніть вживання часів.

At the Institute

Vera: Hello, Mike! What are you doing here?

Mike: Hello, Vera! I am reading for my mathematics exam.

V.: But your group has passed it already, hasn't it?

M.: Yes, it has, but I was absent at this time. So I'll take this exam tomorrow.

V.: Is it difficult for you to take this exam?

M.: No, it is not. I have finished a specialized mathematical school where mathematics was studied more thoroughly than at other schools. Besides, I have taken part in a mathematics contest of our city.

V.: Really? Have you? When was it?

M.: It was last year.

V.: Were you the first at this contest?

M.: No, I was the second. The first one was the boy from one of the Novosibirsk mathematical schools. V.: Have you ever been to Novosibirsk?

M.: Yes, I have been there this year with a group of students of our faculty.

V.: What have you seen there?

M.: Oh, I have seen a lot. But now I have no time to tell you about it. Well, Vera, what are you doing here? Are you reading for your exams too?

V.: No, I am not. I've passed all my exams with good marks this term and so my holidays have already started. I'm waiting for my friend here. Good luck, Mike.

Вправа 5. Визначте, чим виражений підмет кожного речення, перекладіть.

1. After the international conference on ecology it has become possible to begin working at environmental problems on a global scale. 2. Some scientists and engineers are working at improving traditional production processes, others are developing new technologies. 3. The new instruments will enable us to determine the level of pollution in our rivers. 4. Our technological advances make it possible to deal with the most difficult problems. 5. Our lecturer's book on strength of materials is well-known and popular. 6. One must study six years to become an engineer. 7. There is a big library in the new building of our institute. It is a very good library. One may get all the necessary books there and it is possible to keep them till the end of the academic year. 8. It is well-known that technological progress is impossible without electronics, computers, robots and new materials. 9. That ecological problems have become the most important ones at present is evident to all. 10. What is necessary for the students is to get a good qualification. 11.That S.P. Korolyev was the founder of practical cosmonautics is a well-known fact. 12. That theory is combined with practical training is a very good tradition of our educational system. 13. That it is necessary to develop an international ecological program is realized throughout the world.

Вправа 6. Знайдіть присудок в кожному реченні, перекладіть.

1. The electronic industry produces several types of minicomputers. 2. The air in many cities has been polluted by traffic and industry. 3. The lecture on environment protection was very interesting. 4. Mankind has never experienced changes in life and work on such a scale. 5. The task of the world community is to improve the ecological situation in the world. 6. In six years we shall become engineers. 7. It is possible to take measures to protect environment on a global level by the joint efforts of all countries. 8. Professor N. is the dean of our faculty. 9. The important feature of our education is that it combines theory with practical training. 10. The main tendency of our life is that computers are being used in all spheres of technology, science and everyday life. 11. The essential feature in environment protection is that most of it is done by public initiative. 12. What is necessary today is that the protection of global natural resources must be planned. 13. Today one of the most important problems is that big cities are polluted.

СЛОВОТВОРЕННЯ

Вправа 7. Перекладіть похідні слова згідно зі зразком:

дієслово + -er/-or = іменник

to teach — вчити, навчати → teacher —вчитель

to regulate —регулювати → regulator — регулятор

to lecture — lecturer, to speak — speaker, to invent — inventor, to generate— generator, to transform — transformer, to indicate — indicator, to compute — computer;

суфікси прикметників -ant/-ent

to excel — перевершувати → excellent — чудовий

important, efficient, distant, evident, confident, recent;

заперечні префікси

un-/im-questionable — спірний → unquestionable — безперечний, безспірний

material — immaterial, limited — unlimited, important — unimportant, usual — unusual, natural — unnatural, necessary — unnecessary, known — unknown, qualified — unqualified, changing — unchanging, seen — unseen, possible — impossible, perfect — imperfect, personal — impersonal, mobile — immobile.

Вправа 8. Прочитайте і перекладіть інтернаціональні слова.

electricity [Ilek'trIsItI], civilization [,sIvIlaI'zeISqn], economic and social progress ['prqugrqs], transformer [trxns'fLmq], universal [,ju:nI'vWsql], electrometallurgy [I'lektrqume'txlqGI], cable ['keIbl], specific [spI'sIfIk], machine [mq'SJn], photocopying machine, radar ['reIdq], Paris ['pxrIs], generator ['GenqreItq], battery ['bxtqrI], lamp [lxmp], dynamo ['daInqmqu], indicator ['IndIkeItq], nation ['neISqn], energy ['enqGI], service ['sWvIs], laser ['leIzq], compact ['kOmpxkt].

Вправа 9. Прочитайте і запам’ятайте вимову слів.

imagine [I'mxGIn], turn [tWn], daily ['deIlI], completely [kqm'pli:tlI], power ['pauq], appearance [q'pIqrqns], gear [gIq], pulley ['pulI], whole [hqul], range [reInG], device [dI'vaIs], source [sLs], century ['senCurI], design [dI'zaIn], since [sIns], consumption [kqn'sAmpSqn], double [dAbl], health [helT], reduce [rI'djHs], beam [bi:m], advantages [qd'vRntIGIz], clean [kli:n], regulated

['regjuleItId], generate ['GenqreIt], human ['hju:mqn], latest ['leItIst].

СЛОВА І СЛОВОСПОЛУЧЕННЯ ДЛЯ ЗАПАМ'ЯТОВУВАННЯ

advantage *n* — перевага
appearance *n* — поява
application *n* — використання, заява
completely *adv* — повністю
consumption *n* — споживання
cover *n* — охопити, обійняти
design *v* — конструювати, проектувати
device *n* — прилад, пристрій
double *v* — подвоїти
efficient *a* — ефектний
generate *v* — виробляти, продукувати
imagine v — уявляти собі
invent v — винаходити
power *n* — энергія, сила
property *n* — властивість
recent *a* — недавній, останній
reduce v — зменшувати
replace v — заміняти
set up (set) v — споруджувати, установлюватися
source *n* — джерело
state *n* — стан, положення
such as — такий як
transform v — перетворювач
turn v — повертатися, перетворити в
wide *a* — широкий
without *prp* — без
whole *a* — весь, цілий

in the case of — у випадку
to be based on — базуватися на

Text 3A

Прочитайте і перекладіть текст.

Electricity

It is impossible to imagine our civilization without electricity: economic and social progress will be turned to the past and our daily lives completely transformed.

Electrical power has become universal. Thousands of applications of electricity such as lighting, electrochemistry and electrometallurgy are longstanding and unquestionable.

With the appearance of the electrical motor, power cables replaced transmission shafts, gear wheels, belts and pulleys[1] in the 19-th century workshops. And in the home a whole range of various time and labour saving appliances[2] have become a part of our everyday lives.

Other devices are based on specific properties of electricity: electrostatics in the case of photocopying machine, and electromagnetism in the case of radar and television. These applications have made electricity most widely used.

The first industrial application was in the silver workshops in Paris. The generator — a new compact source of electricity — was also developed there. The generator replaced the batteries and other devices that had been used before.

Electric lighting came into wide use at the end of the last century with the development of the electric lamp by Thomas Edison. Then the transformer was invented, the first electric lines and networks were set up, dynamos and induction motors[3] were designed.

Since the beginning of the 20th century the successful development of electricity has begun throughout the industrial world. The consumption of electricity has doubled every ten years.

Today consumption of electricity per capita[4] is an indicator of the state of development and economic health of a nation. Electricity has replaced other sources of energy as it has been realized that it offers improved service and reduced cost.

One of the greatest advantages of electricity is that it is clean, easily-regulated and generates no by-products[5]. Applications of electricity now cover all fields of human activity from house washing machines to the latest laser devices. Electricity is the efficient source of some of the most recent technological advances such as the laser and electron beams. Truly[6] electricity provides mankind with the energy of the future.

Notes to the Text

1. transmission shafts, gear wheels, belts and pulleys — трансмісійні вали, зубчасті колеса, ремені і блоки

2. time and labour saving appliances — електроприлади, що економлять час і працю

3. induction motors — індукційні мотори

4. per capita — на людину; на душу населення

5. by-products — побічні продукти

6. truly — справді

ВПРАВИ

Вправа 10. Прогляньте текст 3А і дайте відповіді на запитання.

1. What is this text about? 2. What industrial applications of electricity do you know? 3. What home applications of electricity do you know? 4. Where was the generator developed? 5. Who invented the electric lamp? 6. Do you know

who invented the dynamo? 7. Can you imagine our life without electricity? Why?

Вправа 11. Визначте функції дієслова *to have,* перекладіть.

1. Electricity has many useful properties: it is clean and generates no by products. 2. It has many important applications in industry as well as in our houses. 3. The latest laser devices have found application in medicine. 4. Electricity has provided mankind with the most efficient source of energy. 5. No other source of energy has been so widely used as electricity. 6. We have many various electric devices in our houses. 7. Our lives have been completely transformed with the appearance of electricity. 8. The generator replaced batteries that had been used before. 9. The consumption of electricity has doubled every ten years.

Вправа 12. Знайдіть підмет і присудок в реченнях, перекладіть.

1. That electricity is clean and easily-regulated is its great advantage. 2. The important fact is that electricity offers improved service at reduced cost. 3. That the two scientists Lodygyn and Yablochkov were the first in Russia to work in the field of electrical engineering is well-known. 4. One of the main advantages of electricity is that it does not pollute the environment. 5. The indicator of nation development is how much electricity is consumed per capita. 6. What has been and is being done in environment protection cannot be measured by yesterday's standards.

Вправа 13. Визначте час і стан дієслова-підмета, перекладіть речення.

A.1. I have not cleaned the window yet. I am cleaning it now. I have cleaned it. 2. But Bob has a different idea. 3. Last year she passed school leaving exams. 4. We will be studying for our exams at the end of the term. 5. While we were having supper, all the lights went out. 6. Will people speak the same language all over the world? 7. People will land on Mars in the 21st century. 8. I think cars will be powered by electric batteries in five years' time and they will not be powered by atomic power in 100 years' time. 9. The Earth is getting warmer because of the increase of carbon dioxide in the atmosphere.

B.1. It is evident that electricity will be the energy of the future. 2. The transformer was invented and the first electric lines and networks were set up at the end of the 19th century. 3. New powerful electric stations must be built because it is electricity that offers improved standards of life and work. 4. A combination of electric lines and networks are being set up throughout the country. 5. Electric power has become universal 6. Electricity is transmitted to distant parts of this country by a combination of electric networks. 7. Our power

stations have been connected by high voltage transmission lines into several networks.

ВПРАВИ ДЛЯ САМОСТІЙНОЇ РОБОТИ

Вправа 14. Визначте, до якої частини мови відносяться наведені нижче похідні слова, і перекладіть їх.

invent — inventor, inventive, invention;
transform — transformer, transformation;
generate — generator, generation, generative;
pollute — polluter, pollutant, pollution;
effect — effective, effectively;
vary — variety, various;
possible — impossible, possibly, possibility;
complete — completely;
recent — recently;
replace — replacement;
economic — economical, economically.

Вправа 15. Знайдіть:

а) синоніми
application, appliance, latest, power, use, enable, reach, device, longstanding, make it possible, achieve, energy, transform, old, turn to, most recent;

б) антоніми
future, unlimited, with, past, necessary, limited, old, unnecessary, without, present.

Вправа 16. Поставте дієслово у дужках у відповідному часі.

My brother (enter) Vinnitsya University (long ago, already, just, next year, last year, this year, by the end of the month, when I came to Vinnitsya).

Вправа 17. Знайдіть речення зі словами *to have, one, that,* перекладіть.

Although the US is a large country with many peoples the language is almost the same wherever one goes. There are two reasons for this. One is that people move around a great deal in the US. A man can grow up in one part of

the country, go to college in another place, find work in another place and marry a girl from still another part of the country.

The second important factor is public communication. Movies, radio and television all have standard way of speech. The southern part of the US is probably the region with the most individual speech. Southern pronunciation differs from that in the rest of the country. Southerners talk slowly and often do not pronounce «r» or a final «g». Another common southern expression is the unusual use of the word «evening». In most parts of the country this means the time after the sun goes down, the early part of the night, but to a southerner it can mean any time after twelve o'clock noon. In the southern mountains there have not been new settlers from other countries for two hundred years. They have ways of speech that are like the English spoken centuries ago when the first people came there from England. Many songs they sing today are those sung long ago in England.

Вправа 18. Поставте дієслово *to be* в відповідній формі.

Today is ..., ..., 20...

I ... at my English class. I ... reading a story about Thomas A. Edison. I ... learning that his laboratories are in Orange, New Jersey. I... glad to read about such a man as Th.A. Edison. A young inventor ... in Thomas Edison's laboratory. He ... looking at an invention that ... in a glass case. It ... an electrical invention. The young inventor's pencil ... in his hand. He ... drawing the part of the invention which he came there to study. An Englishman and his young son ... in Edison's laboratory. They ... looking at hundreds of inventions. Many of them ... in glass cases. The man and his son ... interested in all Mr. Edison's inventions, they ... most interested in the electrical ones. Many of those ....in one room. Several tourists ... in this room, and among them ... the Englishman and his son. The man says to one tourist, «We ... interested in electrical ones».

Вправа 19. Прочитайте і перекладіть текст без словника.

Before Faraday's inventions in the field of electricity and magnetism the only source of electricity that was used was the galvanic battery. It made possible some practical applications: the electric light and electric telegraph. The practical use of electricity on a larger scale became possible after developing electromagnetic machines, generators and transformers. It is considered that the development of the induction motor has become the most important technical achievement. At first, the induction motor had a constant and unchangeable speed (швидкість). Some years later a motor with two speeds was designed. Since its invention the induction motor has been considerably improved and its power increased. But the principle of operation still remains the same.

CONVERSATION

Exercise 1. Answer the questions.

1. What is electricity? (a source of electric power used in every day life and industry) 2. What are the sources of electricity? (batteries, generators, electric motors and many other devices) 3. What properties of electricity have made it widely used? (electrostatics and electromagnetism) 4. What are the advantages of electricity? (clearness, easy regulation, no by-products, low cost, improved service) 5. What are home uses of electricity? (lighting, heating, various time and labour saving appliances, radio, television, video and many others) 6. What are the latest industrial applications of electricity? (lasers and electronic devices)

Exercise 2. Make a sentence out of the two parts.

1. Electricity	1. have already become universal.
2. The applications of electricity in the home and industry	2. has completely transformed our everyday life.
3. Electricity was used for the first time	3. per capita is an indicator of the state of development of a nation.
4. The generator, a new source of electricity	4. the wide industrial use of electricity has begun throughout the world.
5. Since the beginning of the 20-th century	5. was also developed in Paris.
6. Today consumption of electricity	6. for industrial purposes in the silver workshops in Paris.

Exercise 3. Read and learn.

A Story about Edison

Edison: Oh, Ben, I'm glad to see you. How are you?

Wilson: Fine, and how are you?

Ed.: So-so. A lot of work to do. Just today I've begun some important work. Oh, excuse me, meet my assistant John Smith. John, this is my old friend from my home town, Ben Wilson.

Smith: How do you do, Mr.Wilson?

W: How do you do, Mr.Smith? Glad to meet you.

Ed.: Will you come to my laboratory and have dinner with John and me tonight?

W.: Yes, I will.

Ed.: Come at six tonight, will you?

W.: I'll certainly come.

At six o'clock at the laboratory.

W.: Good evening, Tom. Good evening Mr. Smith.

S.: Good evening, Tom. Good evening Mr. Wilson. Mr. Edison is experimenting with a microscope. All his interest is there. Would you mind walking around for a while looking at Mr. Edison's inventions.

W.: With pleasure.

S.: In a few minutes dinner will be brought. We usually eat our dinner here. Don't you mind?

W.: Certainly not.

S.: The dinner is ready. Let Mr. Edison know you are here.

W.: Shall we eat, Tom? But he doesn't answer.

S.: He is busy working with his microscope.

W.: But I am quite hungry. Tom, the food looks good, and it is getting cold.

S.: You see, Mr.Edison never stops working for a second till he is satisfied with what he is doing.

W.: Then let's sit down and eat.

Two hours later Mr.Wilson and Smith finished eating and left the laboratory.

Ed. (entering the laboratory): Oh, I am hungry. If those dishes were not empty, I'd say I've had no dinner tonight.

Exercise 5. Read and smile.

A young doctor, the son of a well-known professor of medicine, proudly (з гордістю) told his father one day: «Imagine, dad! I've cured (вилікувати) that lady that has been your patient for ten years».

«She deserved (заслужити) it. It was she who had paid for your studies», his father replied.

«Where did the car hit him?», asked the coroner (слідчий). «At the junction (з'єднання, перехрестя) of the dorsal and cervial vertebrae (спинні та шийні хребці)», answered the doctor. A big man rose from his seat. «Listen, I've lived in these parts for fifty years», he protested, «and I've never heard of this place».

Text 3B

A Great Citizen of the World

Every day many people visited Thomas A.Edison's laboratories in Orange, New Jersey. Some of them were young inventors who went to study, but many

more of them were tourists. They came from all parts of the US and from other countries as well.

One day a very important citizen from England visited Edison's factories, taking with him his young son, eight years old. They spent many hours in great workshops, looking at hundreds of useful inventions.

Before leaving the laboratories the man went to the office of the main building. Giving his card to the person in charge, he asked: «May I speak to Mr.Edison, please?». The man looked at the card and then answered: «Wait a minute, I'll see». Soon he returned and said: «Come this way, please. Mr.Edison will see you».

The father and his son went into the great inventor's workroom. «Mr.Edison», said the Englishman, «I brought my young son here to see what the world's greatest citizen has done. I want this day to help him all his life. Wig you please shake hands with him and say something that he will remember?»

Mr. Edison took the boy's hand. He laid his other hand on the child's shoulder and looked into his eyes. «My boy», he said, «don't watch the clock».

In 1928 Mr. Edison was eighty-one years old, but he still worked sixteen hours a day.

Text 3C

Solar Light by Night

Most people living in towns consider it a usual thing that streets are lit at night. But street lights need a power supply (джерело енергії) therefore distant areas with no source of electricity remain in darkness until the sun comes up again.

With new appliances now offered by several British firms, many distant places could be lit with solar-powered street lights. It may seem strange that the lamps can use the power of the sun which shines by day when the lamps are needed at night, but they work by using energy accumulated during the day from a solar panel. The solar panel produces electricity which charges (заряджати) a battery. When the sun goes down, the battery power is then used for lighting. Each lamp has its own panel so the system can be used for one individual light or a number of them.

In the south of Saudi Arabia a motorway tunnel miles from any power supply is lit day and night by solar-powered devices. The solar panels provide power during the day and charge batteries which accumulate enough power to light the tunnel at night. The generation of electricity by batteries is still expensive but the advantage of sun-powered lamps is that they can bring light to areas distant from any other power supply.

There is one more advantage of solar power: not only it is unlimited, but also its use does not pollute the environment. That is why it is very important to

develop devices which make it possible to transform solar power into mechanical or electric forms of power.

Text 3D

Non-traditional Renewable Sources of Energy

It is known that much is being done in the world today for the development of non-traditional sources of energy. Without them the Earth cannot support its present population of 5 billion people and probably 8 billion people in the 21st century.

Now we are using traditional power sources, that is, oil, natural gas, coal and water power with the consumption of more than 50 billion barrels per year. It is evident that these sources are not unlimited.

That is why it is so important to use such renewable sources of energy as the sun, wind, geothermal energy and others. Research is being carried out in these fields.

One of the most promising (перспективний) research is the development of power stations with direct transformation of solar energy into electricity on the basis of photo-effect. It was Russia that was the first in the world to develop and test a photoelectric battery of 32,000-volts and effective area of only 0.5 sq.m., which made it possible to concentrate solar radiation. This idea is now being intensively developed in many countries.

However, the efficiency of a solar power station is considerably reduced because of the limited time of its work during the year. But it is possible to improve the efficiency of solar power stations by developing different combinations of solar power stations and traditional ones — thermal, atomic and hydraulic. Today some engineers are working at the problem of developing electric power stations with the use of a thermal-chemical cycle. It will operate on products of the transformation of solar energy, whereas the «solar» chemical reactor uses CO_2 and water steam of the thermal power station. The result is that we have a closed cycle.

In Kamchatka there are geothermal power stations operating on hot water-steam mixture from the depths of about a kilometre. In some projects water will be heated by the warmth of mountains at a depth of four—five km.

It is planned that plants working on the energy of the solar heat provided by the sun will be built on a larger scale.

That different wind energy plants are being developed is also well-known. These energy plants can be small (of several kilowatts) and large powerful systems.

It is important that all these advances in developing new sources of energy and improving the old ones help to solve the energy problem as a whole and they do not have negative effects on the environment.

LESSON 4

Модальні дієслова та їх еквіваленти
Дієслово *to cause*
Сполучення *no longer, because of, due to, thanks to*
Суфікси *-ness; -ance/ence; -ist; -fill; -less*
Text 4A. *Made in Space*
Text 4B. *Composite Ceramics*
Text 4C. *Ancient Steel-Making Secret*
Text 4D. *The British Museum*

Вправа 1. Прочитайте діалоги, звертаючи увагу на вживання модальних дієслів.

A: You can do without lots of things.
B: You can't do without food or water.
A: Oh, yes, you can! You can do without food for weeks and without water for days.
B: Well, you can't do without air or only for a very short time.

****

A: Can you write without a pen?
B: No, of course, I can't.

****

A: I must have a new dictionary.
B: Why must you? You don't need a new dictionary. You've got a lot of dictionaries.

****

A: I want to see Mr. Z.
B: I am sorry. I am afraid he may not be in.
A: But perhaps he may be.
B: No, sir. He may not be back for some time.
A: I can wait.
B: He may not be in until twelve.
A: I can wait until he is in.
B: He may be out all day.

****

A: May I go to the cinema?
B: No, not today, tomorrow.
A: May I go today? Zed can't come tomorrow. May I go home with Zed afterwards?
B: Oh, no, you mustn't do that.
A: Why, mustn't I?

B: Because you mustn't be home late.
A: Well, then, may Zed come home with me?
B: Yes, he may do that.
A: May I have the money, please?
B: Oh, very well.

Вправа 2. Дайте еквіваленти модальних дієслів.

1. Students must take exams in January. 2. She can speak French well. 3. You may take this book till tomorrow. 4. We must learn new words every week. 5.1 live not far from my work. I can go by bus or I can walk. 6. You may come in. 7. We can take this book from the library. 8. She cannot do this work in time. 9. He must go to Kyiv for a few days. 10. We can see electrical devices everywhere.

Вправа 3. Поставте речення в запитальну та заперечну форми.

1. We were able to read that article in the library. 2. Some students will be permitted to take exams in December. 3. You have to read this book. 4. We shall be able to skate in winter. 5. My friend is to take part in the conference. 6. The students of our group had to go to the plant last week. 7. They were allowed to continue their research.

Вправа 4. Перекладіть речення, звертаючи увагу на переклад модальних дієслів.

1. Everyone should know a foreign language. 2. To make supercomputers, we need highly developed electronics and new materials. 3. One should do one's work in time. 4. The students ought to know the history of their institute. 5. The development of new materials does not mean that old materials should lose their significance. 6. Marie Curie needed a laboratory and equipment for her research. 7. Every institute ought to be proud of their famous graduates. 8. One should know that «roentgen» is a unit (одиниця) of radiation.

Вправа 5. Замініть *would* на *used to,* де можливо, та перекладіть.

1. He would spend hours in the Volodymyr Hills. 2. Tsiolkovsky believed that rockets would be used for space travel. 3. Bell and Watson would repeat their experiments many times. 4. It became known that a new car would be shown at the exhibition. 5. Electricity would pass through metals, but wouldn't pass through wood. 6. I asked my friend to help me, but he wouldn't, he said I could do everything without his help. 7. He would work in the library when he was getting ready for his exam.

Вправа 6. Виберіть правильне модальне дієслово або його еквівалент.

можна вирахувати — (must, can, should) calculate; бути здатним виконати — (have to, be able to, be allowed to) carry out; не можна передбачити — (can't, needn't, be not able to) predict; повинен починатися о 10 - (have to, may, be to) begin at 10; слід знати — (should, may, need) know; не потрібно створювати — (may not, needn't, should not) create; необхідно використати — (must, be allowed, may) use; можна взяти цю книгу —(must, can, may) take this book; не бажати зробити — (need, wouldn't, must) do.

Вправа 7. Перекладіть речення.

1. Він вміє читати і писати англійською мовою. 2. Вона повинна зробити цю роботу в кінці місяця. 3. Тепер студенти можуть увійти в аудиторію. 4. Вона може займатися тут. 5. Вона повинна прочитати цю статтю. 6. Можна мені взяти ваш підручник? 7. Я мушу піти до бібліотеки і взяти книги. 8. Можна мені поїхати з вами? 9. Вміє цей малюк ходити? 10. Ви повинні повернути книгу завтра.

Вправа 8. Перекладіть речення, звертаючи увагу на виділені словосполучення.

1. **It was found that** proton and neutron have almost the same weight. 2. **It was necessary** to lay cables across the Atlantic Ocean as there were no radio or satellites at that time. 3. **It is difficult** to imagine the world we live in without radio, telephone and television. 4. **It is possible** to have a direct telephone talk with Vladivostok with the help of satellite systems. 5. This material has properties which **make it useful** for various space projects. 6. **It should be said that** computers become increasingly important in our life and work. 7. My adviser **considers it necessary** for me to read as much literature as possible before starting my work. 8. **It is difficult** to name all the branches of science and technology which are based on electronics. 9. **It is well-known that** «watt» is a unit named after James Watt, an inventor from Scotland. 10. **It is impossible** to solve many modern complex engineering problems without the help of computers.

Вправа 9. Перекладіть заперечні речення.

1. Not long ago chemists developed new materials that could withstand high temperatures. 2. No system of measurement of the past is as simple as the metric system. 3. It is no longer possible to put off the solution of ecological problems. *4.* No one is allowed to smoke in our office. 5. There is no doubt

(безперечно) that the development of electronics is one of the greatest achievements of mankind. 6. Half a century is not a long period in the history of civilization. 7. Before Newton no one could explain why the planets moved around the Sun. 8. People no longer think of radio and television as something fantastic.

Вправа 10. Перекладіть речення.

1. Ships can communicate over long distances due to the radio. 2. Because of the earth's rotation there are days and nights on the earth. 3. Thanks to the radio it is possible to transmit human voice across the globe. 4. Due to the latest achievements in electronics it has become possible to develop supercomputers. 5. Because of their long life solar and atomic batteries are used to supply power to transmitters in spacecrafts. 6. Thanks to the development of radio telescopes radio astronomy has made great achievements. 7. Our century can be called «Space Age» because of the development of a new branch of science and technology — cosmonautics.

Вправа 11. Перекладіть речення, звертаючи увагу на слово *much*.

1. We don't notice the gravitational pull of a book because the pull of the earth is much greater. 2. The speed of computer operations will be much greater in the future. 3. Graphite which withstands much higher temperatures is one of the best materials for reactors. 4. When a spaceship is in space, much smaller energy is needed for its movement.

Вправа 12. Перекладіть речення та запам’ятайте значення дієслова *to cause.*

1. Heating causes different changes in metals. 2. A Danish scientist discovered that electricity caused the needle to move from left to right. 3. Vibration not only causes noise but can also break materials and structures. 4. The space flight of Gagarin caused a sensation throughout the world. 5. Rutherford showed that positive charge of a nucleus was caused by protons. 6. New achievements in mathematics caused the development of new means of computerization.

СЛОВОТВОРЕННЯ

Вправа 13. А. Перекладіть наведені нижче похідні словосполучення за зразком:

іменник + -ful = прикметник

use — користь → useful — корисний

power, skill, success;

іменник + -less = прикметник

use — користь → useless — некорисний

change, noise, water, help, end;

прикметник + -ness = абстрактий іменник

weightless — невагомий → weightlessness — невагомість

useful, dark, hard, weak;

іменник або прикметник + -ist = іменник

science — наука → scientist — вчений

special, art, motor, biology.

В. Перекладіть іменники з суфіксами *-ance/-ence* :

resistance — опір

consequence, distance, appearance, difference, absence, presence.

Вправа 14. Прочитайте та перекладіть інтернаціональні слова.

surprise [sq'praIz], substance ['sAbstqns], magnetIc [mxg'netIk], laser ['leIzq], polymer ['polImq], plastics ['plxstIks], experiment [Iks'perImqnt], orbital ['LbItl], expert ['ekspWt], start [stRt], simulate ['sImjulaleIt], principle ['prInsIpl], gravitational ["grxvI'teISqnl], convection [kqn'vekSqn], temperature ['temprICq], zero-gravity ['zIqrqu'grxvItI], hydromechanical ['haIdraumI'kxnIkql], acceleration [ak"selq'reISqn], project ['prOGekt].

Вправа 15. Прочитайте слова.

label ['leIbl], material [mq'tIqrIql], alloys ['xlOIz], peculiar [pI'kjHljq], numerous ['njHmqrqs], pave [peIv], vehicle ['vJIkl], inertia [I'nWSja], process ['prquses], Archimedes ["RkI'mJdJz], consequently ['kOnsIkwqntlI], separate ['sepqreIt], component [kqm'pqunqnt], quite [kwaIt], gases [gxsIz], cause [kLz], research [rI'sWC], biochemist ["baIqu'kemIst], biological ["baIqu'lOgIkql], special ['speSql].

СЛОВА ТА СЛОВОСПОЛУЧЕННЯ ДЛЯ ЗАПАМ’ЯТОВУВАННЯ

aim *v* - прагнути, цілити(ся)

alloy *n* — сплав

approach *v* — підходити, наближатися

certain *a* — певний

condition *n* — умова
create *v* — створювати
consequently *adv* — отже, тому
launch *n* — запуск
liquid *n* — рідина, *a* — рідкий
manned *p* — з людиною на борту
movement *n* — рух
numerous *a* — численний
obtain *v* — одержувати
possess *v* — володіти
data *n* — дані
density *n* — густота
differ from *v* — відрізнятися від
difference *n* — різниця, розбіжність
estimate *n* — оцінювати
except *prp* — за винятком
i.e. [that is] — тобто
include *v* — містити в собі, охоплювати
thus *adv* — так, таким чином
valuable *a* — цінний
prove v — доводити
substance *n* — речовина
surface *n* — поверхня
vehicle *n* — транспортний засіб, космічний літальний апарат
weight *n* — вага

Text 4A

Прочитайте та перекладіть текст

Made in Space

This label «Made in Space» for industrial materials will probably surprise no one in the not so distant future. They may include superconductors, new kinds of alloys, substances with peculiar magnetic properties, supertransparent laser glass[1], polymers, plastics, and so on. Numerous experiments carried out at the Russian orbital space stations have paved the way[2] to the development of methods and means of industrial production of new materials of better quality on board a spacecraft[3]. Experts estimate that within a few coming years industrial production of various materials will be started in space.

Conditions on board a space vehicle orbiting Earth greatly differ from those on its surface. However, all of these conditions can be simulated[4] on Earth, except for one — prolonged weightlessness. Weightlessness can be created on Earth, but only for a few seconds. A space flight is another matter: a satellite orbiting Earth is in a dynamic zero-gravity state, i.e., when gravity is cancelled out[5] by inertia.

What can weightlessness be used for? Many well-known processes go on differently due to the absence of weight. The Archimedes principle is no longer valid and, consequently, stable-state[6] liquid mixtures can be obtained, the

components of which would immediately separate on Earth because of different density. In case of melts[7] of metals, glasses or semiconductors, they can be cooled down to the solidification point even in space and then brought back to Earth. Such materials will possess quite unusual qualities.

In space there is no gravitational convection[8], i.e., movements of gases or liquids caused by difference of temperatures. It is well-known that various defects in semiconductors occur because of convection. Biochemists also have to deal with the worst aspects of convection, for example, in the production of superpure biologically active substances. Convection makes it very difficult on Earth.

Following the launch of the first orbital stations the specialists started experiments aimed at proving the advantages of the zero-gravity state for the production of certain materials. The experiments proved'that many of the properties of the materials obtained under the zero-gravity condition were much better than those produced on Earth. Besides, it has been established that it is necessary to develop a new science — physics of the weightless state — which forms the theoretical basis for space industry and space materials study. This science has basically been developed. The methods of mathematical modelling of the hydromechanical process under the zero-gravity condition have been created with the help of computers.

Special space vehicles will also be needed for industrial production of new-generation materials. Research has shown that the acceleration rate on board these vehicles must be reduced to the minimum. It was found that space platforms in independent flight carrying the equipment were most suitable for producing materials. These vehicles will have to use their own propulsion systems to approach their base orbital station after a certain period of time. The cosmonauts on board the station can replace the specimens. Many new and very interesting projects are planned for orbital stations. Here is one of them. Convection does not allow to grow large protein crystals on Earth. But it is possible to grow such crystals under the zero-gravity condition and to study their structure. The data obtained during the experiments can be useful for the work of laboratories on Earth in using the methods of gene engineering[9]. Thus, it may be possible to make new materials in space and also to obtain valuable scientific data for new highly efficient technologies on Earth.

Notes to the Text

1. supertransparent laser glass — надпрозоре лазерне скло
2. to pave the way — прокласти шлях
3. on board (a spacecraft) — на борту (космічного корабля)
4. to simulate — моделювати, імітувати
5. to cancel out — знищувати, урівноважувати

6. stable-state — стійкий стан

7. in case of melts — у випадку плавлення

8. gravitational convection — гравітаційна конвекція (передача тепла під дією сили тяжіння)

9. gene engineering — генна інженерія

ВПРАВИ

Вправа 16. Прогляньте текст 4А і дайте відповіді на питання.

1. What is this text about? 2. Have you seen the label «Made in Space» anywhere? 3. Why can't certain materials be produced on Earth? 4. Can all the conditions on board a space vehicle be simulated on Earth? 5. When will it be possible to start industrial production of materials in space? What do you think about it? Can we start such production now? 6. Why can we obtain materials of better quality in space? 7. What equipment is needed for producing materials in space? 8. How will this equipment operate?

Вправа 17. Складіть стверджувальні речення, вибравши правильний варіант.

1. Many well-known processes go on differently in space due to
   a) different density.
   b) the presence of weight.
   c) the absence of weight.
2. The components of stable-state liquid mixtures would separate on Earth because of
   a) high temperature.
   b) different density.
   c) different conditions.
3. It is well-known that various defects in semiconductors occur because of
   a) weightlessness.
   b) solidification.
   c) convection.

Вправа 18. Знайдіть в тексті 4А модальні дієслова та їх еквіваленти. Замініть еквіваленти відповідними модальними дієсловами.

Вправа 19. Виберіть відповідні модальні дієслова.

1. Do you live far? (Can, must) we meet here at 7 o'clock? — We certainly (may, can). — I'll see you later this evening, then. 2. Bill, would you help me? Sure, I'd be glad to help you. What (may, can) I do for you? 3. (Can, may) I take

your pen? I've broken mine. 4. Do you know when Bob comes back from the University? I am afraid he (can, may) be very late. He has an examination tomorrow. He (can, must) study for the examination. 5. Do you have a stamp (марка)? — No, I'm afraid I don't. You (may, must) go to the post office for this. 6. I'm very much interested in environment problems. I think we (must, may) learn to live in harmony with nature.

Вправа 20. Вкажіть речення з модальними дієсловами, які виражають необхідність дії. Перекладіть.

1. As telegraph wires couldn't be hung over the ocean, cables had to be laid on the floor of the Atlantic Ocean. 2. In the next few years engineers are to develop computers of more than 2 billion operations a second. 3. A new kind of telephone may be called a video-phone. 4. One must know that we shall need a lot of specialists that will be able to work and live in space for a long time. 5. To see distant objects clearly, one should change the focus. 6. Within a few coming years a quantity production of various materials is to begin in space. 7. Some liquid mixture components would immediately separate on Earth because of different density. 8. It should be said that special space vehicles are necessary for industrial production of space materials. 9. Our group will be allowed to use new laboratory equipment next term. 10. One can see that there is no principal difference between iron and copper as conductors.

Вправа 21. Знайдіть речення з еквівалентами модальних дієслів *to have to, to be to.*

A. 1. Television has a great number of uses nowadays. 2. Morse discovered that telegraph messages did not have to be written, they could be sent as a sound. 3. That part of this country has become a higly industrial one. 4. Why couldn't you do it yesterday? — Because I had to go home earlier than usual. 5. This important problem had been solved by the end of 2004. 6. In the past messages to and from Europe had to be sent by ship. 7. Some materials with useful qualities will have to be produced in space. 8. A historian has to study a lot of various facts to be able to reconstruct the far past.

B. 1. Such metals as iron, cobalt, nickel and some alloys are much more magnetic than any other substances. 2. In the next few years Ukrainian engineers are to complete the work on supercomputers. 3. The main aim of this article is to explain methods and means of space industrialization. 4. We are living in an electronic world. 5. A number of TV stations are to be linked up into a network. 6. Experiments for industrial production of materials in space are being carried out in many countries. 7. Weightlessness is created on Earth, but only for a few seconds. 8. The quality of these metal parts is to be very high. 9. It was found

that the acceleration rate on board such vehicles was to be reduced to a minimum.

ВПРАВИ ДЛЯ САМОСТІЙНОЇ РОБОТИ

Вправа 22. Визначте, до яких частин мови належать слова, та перекладіть їх.

requirement, constituent, scientific, distance, agronomist, ancient, density, differ, hardness, structural, various, magnificent, presence, property, culture, conductor, presentation, probably.

Вправа 23. Напишіть дієслова від наведених нижче слів.

surprisingly, difference, equipment, mixture, coming, estimation, weightlessness, production, separately, development, movement, disappearance, functional.

Вправа 24. Напишіть прикметники від наведених нижче іменників.

magnet, industry, absence, speciality, weight, probability, orbit, dynamics, preparation, supertransparency, independence, gravitation, superpurity, difficulty, variety.

Вправа 25. Перекладіть слова, враховуючи значення префікса ***super-***.

supercritical, superactive, supercooled, superalloy, superhard, superplastic.

Вправа 26. Знайдіть:

а) синоніми
to start, movement, nowadays, quality, research, various, a means, manufacture, possess, to occur, consequently, numerous, spacecraft, to use, to substitute, certain;

б) антоніми
distant, to stop, few, to reduce, invaluable, unusual, dependence, minimum.

Вправа 27. Виберіть англійський еквівалент українського речення.

1. Він повинен йти додому.

He may go home. He must go home. He had to go home.

2. Він повинен йти додому о 5.

He must go home at 5 o'clock. He is to go home at 5 o'clock. He may go home at 5 o'clock.

3. Він може йти додому о 5.

He may go home at 5. He can go home at 5. He must go home at 5.

4. Він повинен буде йти додому раніше.

He must go home earlier. He should go home earlier. He will have to go home earlier.

5. Йому слід йти додому.

He should go home. He may go home. He had to go home.

6. Він може ходити дуже швидко.

He can walk very quickly. He will be able to walk very quickly. He could walk very quickly.

7. Йому дозволяють йти додому після 3 години.

He is permitted to go home after. 3. He was permitted to go home after 3. He will be permitted to go home after 3.

8. Йому не потрібно відразу йти додому.

He is not allowed to go home at once. He could not go home at once. He needn't go home at.once.

Вправа 28. Вставте слова *because* або *because of.*

1. She must go by bus every morning ... she lives far from the institute. 2. The students cannot translate this text... it is difficult. 3. The planes could not leave the airport... the bad weather. 4. Our life has become easier ... the electricity. 5. Critics would say that the young people were too passive ... they watched TV so much.

Вправа 29. Перекладіть без словника.

The first step in any industrialization project, for example, on the Moon should be preparation for plant construction. It is economically desirable to use local materials for this. It is well-known that metals form the most important group of engineering materials. One must know that they possess necessary mechanical and physical properties. They can be easily fabricated into various forms by a variety of techniques. They are hard, tough (пластичний), strong and temperature-resistant, a combination of properties not available in any other materials. The properties of metals can be changed by heat treatment so that the fabrication is much easier since the work pieces can have properties quite different from those needed in the final product.

CONVERSATION

Exercise 1. Answer the questions.

1. What condition on board a space vehicle can't be simulated on Earth? (prolonged weightlessness). 2. What eliminates gravity during a space flight? (inertia). 3. What can be the industrial use of weightlessness? (the production of new materials with unusual properties). 4. What industrial materials can be produced in space? (superconductors, new kinds of alloys, magnetic materials, laser glass, polymers, plastics, etc). 6. What are the results of the experiments? (much better properties of the materials obtained under the zero-gravity condition than those produced on Earth). 6. What is needed for industrial material production in space? (special space platforms).

Exercise 2. Make a sentence out of the two parts.

1. Experts estimate that within a few coming years	1. for industrial production of new-generation materials at a larger scale is being carried out in the USA, Europe and Japan.
2. Numerous experiments on board	2. very difficult on Earth.
3. They may include	3. i.e. movement of gases or liquids because of difference of temperatures.
4. In space there is no gravitational convection	4. to grow large crystals and to study their structure.
5. Convection makes the production of some materials	5. super and semiconductors, metals, glasses, superpure biologically active substances, etc.
6. But in zero-gravity conditions it is possible	6. the industrial production of various materials is to begin in space.
7. It should be said that research and preparatory work	7. the manned and unmanned space vehicles and space stations proved the advantages of the zero-gravity state for the production of some materials.

Exercise 3. Read and learn.

Tom: Are you going to attend the seminar tonight?
Bill: I should go. Unfortunately, I won't be able to do so.
T.: Why should you go there?

B.: The speaker will talk about composite ceramics. I must know all about this subject. As you know, I'll do some experimental work in this field.next June. So I'll have to know about it.

T.: In that case, you ought to cancel your other plans and attend the seminar. You shouldn't miss it.

B.: You are right. But I can't go.

T.: Why can't you?

B.: Don't you remember? We are to take an exam in French tomorrow. I have to study for the examination.

T.: Do you have to study? Is it a necessity?

B.: Well, I suppose the expression «have to study» is too strong. No one is forcing me. But I really ought to study tonight. Shouldn't you do it too?

T.: I don't have to study. I studied last night and I am sure I can pass it. Besides that, I must attend the seminar.

B.: Why must you attend it?

T.: Have you forgotten? I must introduce the speaker to the audience.

B.: Yes, that's right.

T.: Well, I have to go now. I may be late. I'll see you later.

Exercise 5. Read and smile.

The teacher was trying to explain the fundamentals of Science to her class. «Sir Isaak Newton was sitting under a tree looking up into it when an apple fell on his head, and from that he could discover the law of gravity. Wasn't that wonderful?»

«Yes, it certainly was», a pupil said, «and if he had been at school at his books, he wouldn't have discovered anything».

Text 4B

Composite Ceramics

Advanced ceramic materials have such interesting properties that mechanical engineers are becoming more and more interested in their use as structural parts.

Ceramic cutting tools have been in use for some time. However, it is only during the last twenty years that there has been rapid development in this field because of the development of new composite ceramics.

Composite materials are materials in which two or more different substances, such as metals, ceramics, glasses, or polymers are combined without chemical reaction. As a result one can produce a material with properties

different from those of any of the individual constituents. The constituents of a composite would retain their individual characteristics.

Recently engineers have developed various kinds of composite ceramics which must combine an increased toughness with the same hardness and strength of usual ceramics. A promising recent development is the addition of a tiny quantity of metal to increase toughness and tool life. Thus, at room and high temperatures (1000 °C) the composite ceramics for cutting tools should possess the following properties: high strength, high toughness, high hardness, high thermal shock resistance and high chemical inertness.

Text 4*C*

Ancient Steel-Making Secret

When two metallurgists at Stanford University were trying to produce a «superplastic» metal they became interested in the secret of Damascus steel, the legendary material used by numerous warriors of the past, including Crusaders. Its formula had been lost for generations.

Analyses of a new steel revealed properties almost identical to those they found in Damascus steel, although their own plastic steel had been produced by present-day methods.

The remarkable characteristics of Damascus steel became known to Europe when the Crusaders reached the Middle East in the 11-th century. They discovered that swords of the metal could split a feather in air and at the same time retain their edge sharp through many battles.

The secrets of Damascus steel were known in many parts of the ancient world, especially in Persia, where some of the finest specimens were produced. For eight centuries the Arab sword makers kept the secret about their techniques and methods. And with the invention of firearms, the secret was lost and it was never fully rediscovered.

The two metallurgists carried out a lot of researches. When they realized that they might be close to the discovery of a new material, a sword fancier, at one of their demonstrations, pointed out that Damascus steel, like their own product, was very rich in carbon. This led them to conduct a comparative analysis of their steel and those of the ancient weapons. As a result, it was found that a basic requirement was a high carbon content. The two metallurgists believed it had to be from 1 per cent to 2 per cent, compared to only a part of 1 per cent in ordinary steel. Their research showed how to make steel of even greater hardness than Damascus steel.

Text 4D

The British Museum

The British Museum consisting of the National Museum of Archeology and Ethnography and the National Library is the largest and richest of its kind in the world. Built in the middle of the last century it is situated in central London which consists of quiet squares and streets.

The British Museum was founded by Act of Parliament in 1753 to bring together the collection of Sir Robert Cotton, some others and future addition to them.

Anthony Panizzi designed the famous circular Reading Room at the British Museum. The first thing that strikes a visitor on entering the Reading Room is its unusual shape. It is a perfect circle. The superintendent and his assistant sit in the centre of the room and they issue and collect books. Long rows of reading desks radiate to the outer walls, like the spokes of the wheel.

Many famous people have used the Reading Room at the British Museum. Of the many distinguished people who have used the Reading Room no one was perhaps more regular and more intent than the German philosopher and socialist Karl Marx. Soon after he arrived in England in 1849, Marx became a daily visitor of the Reading Room, where he used to remain from nine in the morning till closing time.

The British Museum has a department of ethnography. Ethnography is concerned with primitive people and their cultures in various stages of development as revealed by their tools, ritual objects and various crafts . This collection is so vast that only a tiny percentage is on show to the general public. Then there is a department of prints and drawings. There are also departments devoted to maps, coins and medals. Visitors interested in chronology can see a large collection of clocks and watches. Those who are interested in philately can find a magnificent collection of postage stamps.

LESSON 5

Дієприкметник
Незалежний дієприкметниковий комплекс
Значення слова *since*
Суфіксы *-age, -ate*
Префікс *en-*
Text 5A. *Television*
Text 5A. *Telegraph*
Text 5A. *Telephone*
Text 5A. *Talking via Space*

Вправа 1. Прочитайте, звертаючи увагу на вживання часів.

- Have you seen a copy of Magna Charta: collection of old English Laws? - I haven't seen all of it. I have seen parts of it many times. I saw three or four articles from it yesterday. I read them in the translated form. Old English is almost as difficult to read as a foreign language. - Where did you see them? - I saw them at the Public Library. -I saw you there. Did you see me? No, I didn't see you. I didn't see anyone whom I knew except the librarian. I didn't see any of my school friends, I mean. - I have seen you at the library many times, but you don't see anyone. The teacher says she has seen you there too, but you see only the books which you are reading.

Вправа 2. Вставте дієслово *to see* в відповідному часі.

I ... a friend in the library yesterday. I ... him there many times before, but he was so busy that I did not speak to him. When I spoke to him he said that he ... never ... me at the library. He concentrates on his work. He ... only his book. The teacher ... him there many times, but he doesn't ... even her. He ... many important facts in books, however, and tells the class about them. He ... and read more important documents than all the rest of our class put together.

Вправа 3. Перекладіть словосполучення:

developing industry, developed industry; changing distances, changed distances; a controlling device, a controlled device; an increasing speed, an increased speed; a transmitting signal, a transmitted signal; a reducing noise, a reduced noise; a moving object, a moved object; . heating parts, heated parts.

Вправа 4. Знайдіть дієприкметник, перекладіть речення.

A. 1. We need highly developed electronics and new materials to make supercomputers. 2. New alloys have appeared during the last decades, among them a magnesium-lithium alloy developed by our scientists. 3. We are carried by airplanes, trains and cars with built-in electronic devices. 4. Computer components produced should be very clean. 5. Many countries have cable TV, a system using wires for transmitting TV programs. 6. The fifth-generation computers performing 100 billion operations a second will become available in the near future. 7. A video phone has a device which allows us to see a room and the face of the person speaking. 8. New technologies reduce the number of workers needed.

B. 1. Driving a car a man tries to keep steady speed and watch the car in front of him. 2. Having stated the laws of gravity, Newton was able to explain the structure of the Universe. 3. Being more efficient than human beings, computers are used more and more extensively. 4. Having graduated from Cambridge, Newton worked there as a tutor. 5. Having been published in 1687, Newton's laws of motion are still the basis for research. 6. Being invented the digital technology solved the old problems of noise in signal transmission. 7. Built in the middle of the last century, the British Museum is situated in central London.

Вправа 5. Визначте, яку функцію виконує слово із закінченням *-ed,* і перекладіть речення.

1. The first television set produced quite a sensation in 1939. The first television set produced in 1939 was a tiny nine-by-twelve inch box. 2. Newton's great work published in 1687 is called «Principia». Newton published his great work «Principia» in 1687. 3. The energy possessed by the body due to its position is called the potential energy. The new material possessed good properties. 4. The equipment required to carry out laboratory experiments was very complex. The equipment required further improvement. 5. The car model developed a speed of 50 miles an hour. The car model developed by our student design bureau will be shown on TV.

Вправа 6. Перекладіть речення, звертаючи увагу на виділені словосполучення.

1. When completed in 1897, Jefferson's building was the largest and costliest library in the world. 2. **If compared** to today's TV program, the first Black-and-white pictures were rather bad. 3. **While being** a teacher of deaf people Bell became interested in sound and its transmission. 4. **Though discovered,** Newton's mistake had no influence on his theory. 5. **While**

working at a new transmitter for deaf people Bell invented a telephone. 6. **If heated** to 100 °C, water turns into steam.

Вправа 7. Знайдіть підмет незалежного дієприкметникового комплексу, перекладіть речення.

A. 1. The room being dark, we couldn't see anything. 2. The book being translated into many languages, everybody will be able to read it. 3. Peter having passed his exams, we decided to have a rest in the country. 4. We went for a walk, our dog running in front of us. 5. The testwork having been written, he gave it to the teacher and left the room. 6. They having arrived at the station early, all of us went to the cafe. 7. My friends decided to go to the park, the weather being warm and sunny. 8. Our library buying all the new books, we needn't buy them ourselves. 9.The fuel burnt out, the engine stopped. 10. Many scientists worked in the field of mechanics before Newton, the most outstanding being Galileo.

B. 1. Numerous experiments having been carried out at the orbital stations, it became possible to develop new methods of industrial production of new materials. 2. President Jefferson having offered his personal library, the foundation of the Library of Congress was laid. 3. Anthony Panizzi designed the Reading Room of the British Museum, the Reading Room being a perfect circle. 4. A beam of light being transmitted forwards, it is possible to measure the distance between the car and the other cars in front of it. 5. The distance having been measured, the computer adjusts the car's speed. 6. Two metallurgists produced a new superplastic metal, the new steel showing properties identical to Damascus steel. 7. The young physicist having discovered Newton's error, other scientists confirmed it. 8. The first TV sets having been shown in New York, the news about it spread throughout the world.

C. 1. With the first steam engine built in the 17-th century, people began to use them in factories. 2. The inventor was demonstrating his new device, with the workers watching its operation attentively. 3. With his numerous experiments being over, Newton was able to write his work very quickly. 4. With the current being switched on, the machine automatically starts operating.

Вправа 8. Перекладіть речення.

1. Читаючи книгу, він звичайно робить нотатки (make notes). 2. Прочитавши текст, ми обговорили його. 3. Відповідаючи на питання, він зробив кілька помилок. 4. Відповівши на запитання викладача, ми почали перекладати новий текст. 5. Як гарний провідник електрики, мідь широко використовується в промисловості. 6. Побачивши зелене світло, ми

перейшли вулицю. 7. Купуючи газету, він загубив гроші. 8. Купивши газету, він пішов до метро.

Вправа 9. Перекладіть речення. Запам'ятайте значення виділених слів.

1. The Reading Room of the Library of Congress **houses** a great collection of reference books. 2. The **Houses** of Parliament are situated in the centre of London on the banks of the Thames. 3. The fuselage of a new cargo aircraft can **house** large-size equipment. 4. Solar power can be used as a source of **heat.** 5. When we **heat** water, it turns into steam. 6. **Heat** energy may be of a kinetic form. 7. A new computerized system **monitors** the production processes of this plant. 8. This plant is equipped with video and television **monitors.** 9. Our laboratory is developing an electronic **monitoring** system for cars. 10. In new cars instrument panels will have a means to **display** different objects on the road. 11. Liquid-crystal **display** was used in the first colour television set. 12. A special electronic device **signals** the engine to stop. 13. Now it is possible to send **signals** over long distances.

Вправа 10. Визначте, в яких реченнях *only* — прислівник, а в яких — прикметник.

1. The higher school today considers education not only as a collection of useful facts and theories but as a process which trains the mind to think, analyze and make decisions. 2. Halley's Comet is the only comet which has been regularly observed for more than 200 years. 3. Many experts now question the idea that environmental problems began only with the industrial revolution in the 19th century. 4. Since their first appearance in 1939 only few people owned television sets. 5. The collection of ethnography in the British Museum is so vast that only a tiny percentage is on show to the general public. 6. When we speak about the further development of computers, we mean not only quantity, but also high technology and high speed.

СЛОВОТВОРЕННЯ

Вправа 12. Перекладіть похідні слова за зразком:

прикметник
іменник + *-age* = *іменник*
дієслово

short — короткий → shortage — нестача

mile — миля → mileage — відстань у милях
to use — використовувати → usage — використання
advantage, breakage, blockage;

суфікс дієслова ***-ate***
illuminate — освітлювати; sophisticate — ускладнювати
regulate, demonstrate, concentrate, separate, indicate;
префікс ***en-*** *+ прикметник = дієслово*
rich — багатий → to enrich — збагачувати
to enable, to ensure, to enlarge, to enclose.

Вправа 12. Прочитайте та перекладіть інтернаціональні слова.

public ['pAblIk], transport, future ['fjHCa], pilot ['paIllqt], role ['reul], carburetor ["kRbju'retq], control [kaqn'trqul], display, component [kqm'pqunqnt], model ['mOdl], characteristics ["kxrqktq'rIstIks], diagonally [daI'xgqnqlI], automatic ["Ltqm'xtIk], automatically, automobile ['LtqmqubJl], motor ['mqutq], decade ['dekeId], gasoline ['gxsquJn], nature ['neICq.], to project [prq'djekt], Sahara [sq'hRrq], ceramic [sI'rxmIk], radar ['reIdq].

Вправа 13. Прочитайте та запам’ятайте вимову слів.

vehicle ['vJIkl], drive [draIv], driver, arrive [q'raIv], arrival [q'raIvql], guidance ['gaIdqns], private ['praIvIt], motorway, motorcar, lane [leIn], luxury ['lAkSqrI], exhaust [Ig'zLst], device [dI'vaIs], adjust [q'GAst], fuel [fjuql], calculate ['kxlkjuleIt], average ['xvqrIG], since [sIns], feature ['fJCq], aerial ['FqrIql], directly [dI'rektlI], danger ['deInGq], observe [qb'zWv], warn [wLn], buzzer ['bAzq], Japan [Gq'pxn], Japanese ["Gxpq'nJz], angle ['xNgl], axis ['xksIs], data ['deItq], impassable [Im'pRsqbl], valve [vxlv], 5°C [faIvdI'grJz'sentIgreId], engine ['enGIn].

СЛОВА ТА СЛОВОСПОЛУЧЕННЯ ДЛЯ ЗАПАМ’ЯТОВУВАННЯ

appear v — з’являтися
artificial *a* — штучний
compare v — порівнювати
contain v — містити (в собі)
continuous *a* — тривалий
convenient *a* — зручний
direct *a* — прямий, безпосередній
during *prp* — протягом, під час
equipment *n* — обладнання
essentially *adv* — по суті
etc (etcetera) —тощо
exist v — існувати
few *a* — мало, небагато
a few — декілька
influence *n* — вплив
means *n* — засоби

nowadays *adv* — тепер, в наші дні
occur *v* — траплятися
rapidly *adv* — швидко
research *n* — дослід
simultaneously *adv* — одночасно
state v — стверджувати
a lot of — багато;
to be able to — могти
switch on v — включати
time *n* — час, times — рази
transmit v — передавати
watch v — спостерігати, дивитися
weigh v — зважувати, важити
within *prp* — в, в межах, протягом

Text 5A

Прочитайте та перекладіть текст.

Television

The television set is evidently the most important and popular electronic product of all time. All homes in developed countries have one or more TV sets and in many countries there are considerably more TV sets than telephones.

But in 1939 at the World's Fair in New York a tiny nine-by-twelve inch box was the centre of attention for hundreds of people. They were the first to see a television set in action. Compared to today's TV shows of underwater and outer-space research, those first black-white pictures were not very good. The pictures were only transmitted from one side of the Fair territory to the other. But in 1939 they were of historical importance.

Within a few days the news of television spread throughout the world. A lot of people wanted to have a look[1] at the new invention. Everyone was interested in it. But only few people owned television sets in the next few years. When World War II broke out[2] electronic factories that began the TV production stopped making them and started making war materials instead. When the war was over, TV sets began coming off factory assembly lines. By 1958 there were millions of them.

In a surprisingly short time people watched fewer films and turned from newspapers and magazines to TV. In its short history television has had great influence on people's life and way of thinking. Rocket-launching, concerts and football and tennis matches can be seen direct as they occur. The boundaries of time and space have disappeared.

At present TV communication is provided with the help of a system of artificial earth satellites so that people living in different parts of the country and all over the world and in different time zones are able to watch the central TV programs at the most convenient hours.

Nowadays many countries also have cable TV, a system using wires for the transmission of television programs (like telephone calls). Cable television first appeared in 1949 as a means of transmitting TV signals to rural and mountain

areas far from big cities. Cable television's next big step forward was made by the mid — 1980s. Scientists announced that many technical problems had been solved and in the future it would be possible via satellite and cable TV to use more channels on a TV set at every home in the world.

Then we saw how a new technical invention, colour television, was rapidly replacing black-and-white television. Recently it was reported that the first pocket-size[3] colour television set had been developed. It was stated that a liquid-crystal display[4] was used similar to those on calculators and watches and that it weighed less than a pound.

A few years ago it became evident that the next major advance for TV would be digital television. In a digital system the usual continuous signal is replaced by a digital code containing detailed information on brightness, colour, etc. A digital TV set hangs on the wall like a picture. Essentially, it is a minicomputer with a visual display. Once a week[5] you put the programs you like into the memory, and the TV set will automatically switch on the desired channel at the right time. You can watch several programs simultaneously on miniscreens and then produce one of them in full format. Also, the TV set can automatically video-record the programs when you are absent or occupied.

By the end of 1980s television has moved to a new and the most important stage in its development since the appearance of colour television. Technically it is called high-definition television (HDTV)[6] or Hi-Vision. This is the much higher resolution television[7] of the 21st century. This revolution was started by Japanese manufacturers when they developed a new video system with a picture resembling a wide-screen film more than traditional television. The new system increases the screen's width-to-height ratio[8] (16:9). The result is a picture several times sharper than in the existing TV sets. Besides, recent developments in plasma display panel technology[9] make HDTV commercially practicable. The plasma display makes it possible to produce a large, bright, colour, flat TV screen so thin and light that it can also be hung on a wall like a framed picture. The engineering problem that has existed almost since the first days of television may be solved now.

Notes to the Text

1. to have a look — подивитися, глянути
2. to break out — початися, вибухнути, спалахнути
3. pocket-size — кишеньковий
4. liquid-crystal display — пристрій зображення на рідких кристалах
5. once a week — один раз на тиждень
6. high-definition television (HDTV) — телебачення кращої чіткості
7. high resolution television — телебачення з великим розширенням
8. width-to-height ratio — співвідношення ширина-висота
9. plasma display panel technology — виробництво плазмових панелей

ВПРАВИ

Вправа 14. Прогляньте текст 5А і дайте відповіді на питання.

1. When did the first TV set appear? 2.Were people interested in the new invention? 3. Why was the TV production stopped in 1940? 4. What is cable television? 5. What is digital television? 6. What is high-definition television?

Вправа 15. Вкажіть, які з наведених нижче речень відповідають змісту тексту 5А.

1. A lot of people owned television sets in the first years after its invention. 2. First television black-and-white pictures were excellent. 3. Only few people owned television sets in the next few years after their appearance. 4. Black-and-white television was rapidly replacing colour television. 5. First television black-and-white pictures were not very good. 6. Only a few years ago colour television was rapidly replacing black-and-white television. 7. When the war was over, TV sets stopped coming off factory assembly lines. 8. After World War II TV sets began coming off factory assembly lines.

Вправа 16. Знайдіть дієприкметники та перекладіть речення.

1. Studying Newton's work «Principia», a young physicist discovered a mistake in the calculations. 2. Having designed a car radar, the engineers started complex tests. 3. While driving a car one should be very attentive. 4. A new electronic instrument will calculate how far one can drive on the fuel left in the tank. 5. The engine tested showed that it needed no further improvement. 6. Scientists are experimenting with a system allowing drivers to see better after dark. 7. The system being tested will increase the safety and fuel efficiency of a car. 8. Having been tested, the computer system was installed at a plant. 9. Soon the night-vision system designed will be available. 10. The synthetic magnet has a lot of valuable qualities that can be changed, if desired. 11. Recently there have appeared battery-powered cars. 12. The radar used was of a completely new design. 13. Having been heated, the substance changed its properties. 14. Being provided with batteries an electric car can develop a speed of 50 miles an hour. 15. When mass produced, electric cars will help solve ecological problems of big cities. 16. A defect undetected caused an accident. 17. Though first developed for military purposes, radar can be used in modern cars.

Вправа 17. Перекладіть речення, звертаючи увагу на незалежний дієприкметниковий комплекс.

1. Electrons moving through the conductor, electrical energy is generated. 2. The current in a circuit was decreased when in a circuit was increased when

the resistance was increased, other factors remaining the same. 3. Transistors being very sensitive to light, engineers use this property. 4. Some radioactive materials have been found in nature, uranium being one of them. 5. The engineers using semiconductors, good results have been achieved.

ВПРАВИ ДЛЯ САМОСТІЙНОЇ РОБОТИ

Вправа 18. Визначте, до яких частин мови належать слова.

dangerous, automotive, longitudinal, automatically, present, nature, motorist, enrol, enrolment, guidance, average, current, ignition, diagonally, calculate, impossible, graduate, village, public, garage, useful, usefulness.

Вправа 19. Перекладіть слова, звертаючи увагу на значення суфіксів *-er/-or*.

driver, sensor, starter, monitor, microprocessor, detector, transistor, carburetor, user, transmitter, lecturer, generator.

Вправа 20. Напишіть початкову форму наведених слів:

companies, easier, accordingly, better, creating, biggest, cried.

Вправа 21. Знайдіть:

а) синоніми
regulate, modern, want, select, use, current, wish, average, adjust, choose, mean, apply;

б) антоніми
unbelievable, cooling, continuous, passable, heating, believable, discontinuous, impassable.

Вправа 22. Перекладіть речення і запам’ятайте значення слова *since.*

1. Since 1770 there were many brilliant inventions in the automobile industry. 2. The production of motor cars in Great Britain was stopped since there were severe speed limits. 3. In early days many of the cars broke since transmissions were still unreliable and often went out of operation. 4. Since conventional headlights are not very effective, a new system has to be developed. 5. Since the French engineer Gugnot invented the first self-propelled vehicle in 1770, the automobile industry developed very rapidly. 6. The number

of chemical elements known to science has grown considerably since Mendeleev created his Periodic Table in 1871.

Вправа 23. Перекладіть речення і запам'ятайте значення слова *too* перед прикметником.

1. The task is too difficult for them. 2. The size of the device is too big now. 3. The difference in temperatures was too great. 4. The old system is too complicated. 5. A sensor mechanism for a car is too large at present.

Вправа 24. Перекладіть речення і запам'ятайте значення слів *future* і *further.*

1. In the future it will be possible to use more channels on every TV set via satellite and cable TV. 2. Scientists throughout the world were quick to realize the importance of the radio and contributed much to its further development. 3. The subjects that the students study in the first and the second years are very important for their future speciality. 4. The use of computers in cars is a further step in improving safety on the road. 5. I'll give you further instructions tomorrow.

Вправа 25. Вставте *only* і *the only,* перекладіть речення.

1. The Earth is ... planet having liquid water. 2. It is useful to remember that the industrial revolution began ... at the end of the 18th century. 3.....way to achieve good results is to apply one's knowledge to practical work. 4. The revolution in science and technology affects not ... economically developed countries, but also developing countries. 5. Multicylinder engines came into use ... after World War II. 6. The motor car has not ... brought mobility to millions of people, but also has polluted the atmosphere. 7. Weightlessness can be created on Earth, but... for a few seconds. 8. ... requirement for plastic steel is that it must be rich in carbon. 9. The Library of Congress serves not... to Members of the Congress, but also to libraries throughout the US and the world.

Вправа 26. Вставте відповідні форми дієслова *to have.*

I ... a good car for sale. It ... many extra parts. It ... a good speedometer and four new tires. It ... a new spare tire too. - ... it its original paint? - No, it... its original paint. It... new paint on it. It looks new. - I.... a good offer for it yesterday, but the man ... very little cash. I want cash. - ... it a good engine? - Yes, it... an excellent engine. It ... any weak places in it. Engines that... weak places in them are al ways in the garage. - I ... an idea you will sell your car. - I ... two

good offers yesterday. One man ... all cash. But he doesn't look like an honest man. I ... no desire to do business with him.

Вправа 27. Замініть підрядні речення дієприкметниковим зворотом.

1. While Boris was driving home, he saw an accident. *2.* After we had talked with Peter, we felt much better. 3. When John arrived at the station, he saw the train leave. 4. After he had left the house, he walked to the nearest metro station. 5. When I looked out of the window, I saw Mary coming. 6. As we finished our part of the work, we were free to go home. 7. As Ann had had no time to write us a letter, she sent a telegram.

Вправа 28. Прочитайте та перекладіть без словника.

Recently it was reported in the press that the USA was trying to build bigger, better and much more expensive TV sets. Experts declared that it was the most important change in television since the invention of colour television. They informed that a new kind of television had images so clear that watching it was like looking through a window.

But it became known that Japanese specialists had started their work on HDTV when nobody else in the world was thinking how to improve TV. The inventors expected that their standard for high-definition television would be used throughout the world. However, the Europeans have announced that they would set their own standard. And now it is not clear whether the Japanese standard will be used or not. Some people consider that a single high-definition TV standard will allow to exchange news and may bring nations together.

CONVERSATION

Exercise 1. Answer the questions.

1. What invention was the center of attention at the World Fair in New York in 1939? (the first black-and-white television set) 2. What stopped the TV production? (World War II) 3. What influence has had television on people's life and way of thinking? (great influence; boundaries of time and space have disappeared) 4. What kinds of TV exist now? (satellite, cable, colour, digital and high-definition television) 5. What is the latest and the most important stage in the development of television since the appearance of colour television? (high-definition television) 6. What is the advantage of high-definition television? (the television of much higher resolution) 7. What technology makes HDTV commercially practicable now? (plasma display panel technology)

Exercise 2. Make a sentence out of the two parts.

1. The first black-and-white nine-by-twelve inch TV sets	1. has been replaced by colour television.
2. In a surprisingly short time	2. the development of TV became digital television in which
3. At present	3. were of historical importance in 1939.
4. Satellite and cable TV makes it possible	4. television has had great influence on people's life and way of thinking.
5. Recently black-and-white TV	5. is the most important stage in the development of TV since the appearance of colour television.
6. The next major advance in	6. to watch TV programs in different parts of the country and throughout the world.
7. The invention of high-definition television with a picture resembling a wide screen film the usual signal is replaced by a digital code.	7. there are different kinds of television systems: satellite, cable, colour, pocket-size, digital, high-definition television.

Exercise 3. Read and learn.

At the Telephone

Mr. Smith: Can I use your telephone for a long distance call? I couldn't find a pay phone in the building.

Mr. Wilson: Sure.

Mr. S.: My wife is going to meet me in New York tomorrow. I want to tell her what time the train gets in.

Mr. W.: Here you are. New York you can dial the number direct. Dial 2 and then the number.

Mr. S.:There's no answer. I'll call later.

Mr. W.:You can use the telephone any time you want.

Mr. S.:Direct distance dialing is wonderful, isn't it?

Mr. J.:I can't hear you, dear. Operator, will you try again.

O.: I think that's better now.

Mr. J.: Are you there? Is that you, Mary, dear? I say, can you hear me?

Mrs. J.:Yes, dear, I can.

Mr. J.: I shall be arriving at Waterloo Station at 5.40 this afternoon. Will you come and meet me?

Mrs. J.:Certainly, darling.

Mr. J.: There is something else I want to tell you. Get hold of Smith at the office, will you? Ask him to ring me up tomorrow in the morning.

O.: Your time is up. If you want to speak on, drop another sixpence, please.

Mr. J.:All right, dear, so long.

Exercise 4. Read and smile.

A Letter to a Sweetheart

A young man was writing a letter to his sweetheart who lived just a few miles away in a nearby town. He began to tell her how much he loved her and how wonderful he thought she was. But the more he wrote, the more poetical he became. Finally, he said that in order to be with her he would suffer the greatest hardships, he would face the greatest dangers that anyone could imagine. In fact, to spend only one minute with her, he would climb the highest mountain, he would swim the widest river, he would fight the fiercest animals. He signed his name, and then suddenly remembered that he had forgotten to mention something rather important. So, in a postscript below his name, he added: «By the way, I'll be over to see you on Wednesday night — if it doesn't rain».

A Frenchman in England

A Frenchman was once travelling in England. He could speak English quite well but not perfectly. His vocabulary was not large.

Once, for example, he was eating in a small country inn and he wanted to order some eggs. But he couldn't remember the word for eggs.

Suddenly, through the window, he saw a rooster walking in the yard. He immediately asked the waiter what the bird was called in English. The waiter told him that it was called a rooster. The Frenchman then asked what the rooster's wife was called. The waiter told him that she was called a hen. The Frenchman then asked what the hen's children were called. The waiter told him that they were called chickens. The Frenchman then asked what the chickens were called before they were born. The waiter told him that they were called eggs. «Fine!», said the Frenchman, «Please bring me two plus a cup of coffee and some toast.»

Text 5B

Telegraph

Benjamin Franklin, an American who is famous for his interesting and useful inventions, published his ideas about electricity in 1752. Scientists in

many countries became interested in this wonderful form of energy. They wanted to find the answer to a very important question: could the electricity be used to develop a fast, efficient system of long-distance communication? Experiments proved that electricity could travel instantly over a very long piece of wire. But a note that was written on a piece of paper couldn't be put into a wire. How could electricity be used to send a message? A Danish scientist discovered that electricity could move a needle from left to right and that the needle could be pointed at letters on a piece of paper. Then a German government worker made up a code system that could be used with an electric needle. In 1837 two English scientists sent a message by electric telegraph for a distance of more than 1.6 kilometers. Samuel Morse, an American portrait painter, was experimenting with an electric telegraph too. At first he connected a pencil to an electric wire. When the electricity came through the wire the pencil made wavy lines. Then Morse invented a code that used dots and dashes for the letters of the alphabet. Finally, he discovered that telegraph messages did not have to be written, they could be sent in sound.

On May 24, 1844, the first long-distance message was sent by telegraph for 64 kilometers.

Telegraph companies were formed in many cities. By 1861 telegraph wires stretched from the Atlantic to the Pacific. In Europe too, Samuel Morse's system became popular.

But telegraph wires couldn't be hung over an ocean. Messages to and from Europe had to be sent by ship — a journey of two or three weeks. A new method was needed.

The Atlantic Telegraph Company which was organized in 1856 wanted to try to lay a cable on the floor of the Atlantic Ocean. The 4,000-kilometer cable broke three times. Each time a new cable had to be made. Finally, on July 27, 1866, the first transatlantic message was sent from Newfoundland to Ireland.

Later cables were laid to Central and South America. After 1900 transpacific cables were laid to Asia and Australia. At last news and business information could be sent instantly to almost every country in the world.

Text 5C

Telephone

Alexander Graham Bell never planned to be an inventor, he wanted to be a musician or a teacher of deaf people. The subjects that he studied at school included music, art, literature, Latin and Greek. They did not include German which all scientists used in their books. Alexander's mother was a painter and a musician. His father was a well-known teacher of deaf people.

When Alexander was only sixteen, he became a teacher in boy's school in Scotland. He liked teaching there, but he still wanted to become a teacher of deaf people as his father.

He read all the books about sound that he could find and started to work on some of his own experiments.

At twenty five Alexander became interested in finding a way to send human voice through an electric wire. The parents of his pupils contributed money for the equipment. He found an assistant, Tom Watson, who worked in an electrical shop. For two years Tom and Alexander were working together to build a machine that people could use to talk to one another over long distances. After two years, the two young men were becoming discouraged. Then, one day, when they were working on a new transmitter Alexander spilled some acid on himself. Tom Watson, who was alone in another room, heard a voice. The voice was coming through a wire to a receiver on the table! The voice was Alexander Bell's! It was saying: «Come here, Mr. Watson. I need you!»

The first telephone line was built in Germany in 1877. By 1915 a telephone line was opened in the United States — 5,440 kilometers from New York to San Francisco.

Now design bureaus all over the world are conducting experiments to develop video-phone or picture phone. A young man in Moscow wants to speak to his friend in Vladivostok. He lifts his telephone receiver, dials a number. After a very short time his friend answers. As he picks up his receiver, his picture appears on the screen. They can speak to each other face to face because they are using a new kind of telephone which may be called «a video-phone». In addition to the usual telephone, the equipment includes a small television screen (14 cm by 13 cm) and, combined with the screen, a television camera. The camera tube will allow the user to switch from a wide view of the room to the face of the person speaking. The focus can be changed to give clear pictures of objects 0.3,0.9 and 6.0 meters away from the camera. There is also a mirror attachment, which allows the camera to scan documents which may be lying on the table. The camera adjusts itself automatically to different lighting conditions.

Text 5D

Talking via Space

Communication has come a long way from the time when an Indian beat a drum in the forest to the time when a scientist receives messages from a satellite. In this space age communication has become a highly developed field. The system of communication in large countries is unthinkable today without space satellites. Besides large distances, there is a great time difference: the territories of some countries comprise up to 11 zones. Satellites help to minimize all the

difficulties that may appear. They rapidly transmit TV and radio programs to different towns, cities, and distant areas.

Space systems and electronic technology have made it possible to set up an automatic system of communication designed for rapid transmission of all kinds of information.

People write letters and send telegrams. But at the same time people living in various cities like to exchange news on the telephone. Statistics reports that the number of longdistance telephone calls is about 2, 000 million per year. ,A person in Moscow talking on the phone with Vladivostok must know that this conversation is carried on through a satellite.

Trains and cars can use mobile radio telephones to make calls. Businessmen can use fax machines which provide electronic transmission of documents and messages over telephone lines. Even photographs can be sent and received over telephone wires.

Practically all the population in large countries can watch TV via satellites. The orbital communication systems make it possible for people from different continents to see and hear one another.

The importance of space means of communication is increasing every year. The communication satellites of the international organization «INTERSAT» enable people to keep reliable telephone, telegraph, telex and fax communication in any weather with ships practically in every part of the World Ocean.

LESSON 6

Герундій
Значення *as* і *by*
Суфікси *-ize* (-ise)
Префікс over-
Text 6 A. *Is there an End to the Computer Race?*
Text 6 B. *Computers Concern You*

Вправа 1. Знайдіть герундій та перекладіть речення.

1. On detecting danger on the road the computer signals the driver. 2. Detecting an object in front of a car in the dark is the purpose of the «night vision system». 3. One of the main problems of a driver on the road is keeping the speed constant and watching the cars ahead. 4. A new device for monitoring and adjusting air pressure in tires has recently been developed. 5. Before starting a car one must examine it carefully. 6. Computers are widely used for controlling all kinds of processes. 7. Alexander Bell's being a teacher of deaf people influenced his interest in sound and its transmission. 8. Samuel Morse's hobby was experimenting with electricity. 9. Driving a truck in the city is difficult.

Вправа 2. Визначте форми і функції герундія.

1. One of the best ways of keeping the speed steady is using a computer for this purpose. 2. Newton's having made a mistake in his calculations has no influence on his theory. 3. On being turned on the radar will warn the driver of stationary or slow-moving objects on the road. 4. Upon being heated the molecules begin moving very rapidly. 5. The white line in the centre of the road is one of the most effective means of controlling traffic. 6. The function of a car computer is detecting and summing up the information about the road conditions. *7.* Monitoring and adjusting air pressure in tires is one of the new developments of the car designers. *8.* It is difficult to solve some of the present-day scientific and technological problems without using supercomputers. 9. On seeing a red light on a panel and on hearing a warning sound the driver should decrease the speed. 10. By picking, up infrared rays emitted by objects ahead of the car an image-processing system produces different images of objects. 11. On studying for half an hour before an exam one should switch over to some other activity.

Вправа 3. Перекладіть речення і запам'ятайте значення виділених слів.

A. 1. When the first self-propelled vehicles appeared, **measures** were taken to limit their speed in many countries. 2. His having **measured** the distance will enable him to calculate the intensity of light. 3. The universal system of **measures** and weights was worked out by the French Academy of Science in 1791. 4. The distance from the North Pole to the Equator was **measured,** one-fourth was taken and divided into ten million equal parts. One of these parts was called a **«measure»** or «a meter».

B. 1. One of the earliest ideas to propel a vehicle **using** mechanical power was suggested by Isaac Newton. 2. Having **used** a steam-driven engine a French engineer built a three-wheeled vehicle for two passengers. 3. At the end of the 19th century the **use** of cars was still very limited. 4. Constant efforts are made to **use** standard components for the cars. 5. The **use** of multi-cylinder engines greatly increased the speed of cars. 6. N. Otto having **used** the gasoline engine, motor cars got the standard shape and appearance.

C. 1. Many **times** Alexander Bell wanted to stop his experiments being unable to get any results. 2. Since ancient **times** people dreamt of flying. 3. Four **times** five is equal to twenty. 4. There is much more lithium on the earth than zinc, 130 **times** more than cadmium. 5. The magnesium-lithium alloy is 1.5 **times** lighter than aluminium and 4.5 **times** lighter than iron.

Вправа 4. Перекладіть речення і запам'ятайте значення *as*.

1. People no longer think of the radio and television as something fantastic. 2. It was necessary to lay cables across the Atlantic Ocean as there was no radio or satellites at that time. 3. Rocket launching, concerts, football and tennis matches can be seen on TV as they occur. 4. As the operation of integrated circuits depends on microscopic components, the purity of all materials at the plant must be very high. 5. One can see that there is no principal difference between iron and copper as conductors. 6. President T. Jefferson offered his personal library as the basis for the national library. 7. It is difficult for the first-year students to study at the University as they do not know yet how to organize their work and time. 8. No system of the past was as simple as the metric system. 9. Such metals as iron, cobalt, and nickel are much more magnetic than any other known substances. 10. Cryogenic fuels such as liquid hydrogen are used to cool the aircraft surface. 11. Metallurgists are trying to make composite materials as strong and light as possible. 12. Measures must be taken to keep Kyiv air as clean as possible. 13. Engineers are working at the problem of making computers as small as possible.

Вправа 5. Перекладіть речення, враховуючи різні значення прийменника *by*.

1. It should be said that according to estimates the production of materials in space is to bring 60 billion dollars by 2030. 2. The best way to study before the exam is by changing one's activity every 30 minutes. 3. Driving a new Japanese car a driver will find his way even in Sahara by switching over to a navigation Earth satellite. *4.* By I960 the number of cars in the world has reached 60 million. 5. A driver may avoid collisions on the road by using a radar system. 6. Newton's great work «Principia» was published by Halley, the famous astronomer, who paid his own money for it. 7. The cosmonauts were told to increase their daily exercises by 30 minutes.

СЛОВОТВОРЕННЯ

Вправа 6. Утворіть та перекладіть похідні слова за зразком:

Прикметник або іменник + **ize/ise** = *дієслово*
special — *спеціальний* → **specialize** — *спеціалізувати(ся)*
computer, ideal, crystal, central;
префікс **over-** *(понад-; пере-)*
to heat — *нагрівати* → **to overheat** — *перегрівати*
production, active, grow, estimate.

Вправа 7. Прочитайте та перекладіть інтернаціональні слова.

aviation, airplane, project, passenger, liner, model ['mOdl], fuselage ['fjHzIlRZ], horizontal stabilizer ['steIbIlaIzq], rocket, distance, meter ['mJtq], diameter [daI'xmItq], cabin, technological, problem, thermodynamics ['TWmqudaI'nxmIks], aerodynamics ['FqrqudaI'nxmIks], per cent, efficIency [I'fISqnsI], extreme [Iks'trJm], temperature ['temprICa], cryogenic ['kraIqGenIk].

Вправа 8. Прочитайте і запам’ятайте вимову слів.

supersonic ['sjHpq'sOnIk], hypersonic ['haIpq'sOnIk], Paris ['pxrIs], Tokyo ['tqukjqu], plane [pleIn], hours ['auqz], reliable [rI'laIqbl], combined [kqm'baInd], engine ['enGIn], heat-insulating [hJt'InsjuleItInN], extreme [Iks'trJm], generate ['GenqreIt], generation, in general, require [rI'kwaIq], fuel [fjuql], liquid ['lIkwId], hydrogen ['haIdrIGqn], surface ['sWfIs], vaporize 'veIpqraIz], inject

[In'Gekt], combustion [kqm'bAsCqn], chamber ['CeImbq], percentage [pq'sentIG].

СЛОВА І СЛОВОСПОЛУЧЕННЯ ДЛЯ ЗАПАМ'ЯТОВУВАННЯ

according to *adv* — згідно з, відповідно до
available *a* — придатний, наявний
beam *n* **—** промінь
built-in *p. p.* — вбудований
by means of *prp* — за допомогою
calculation *n* **—** обчислення
capable *a* — здатний, здібний
circuit *n* — схема, коло
close *a* **—** близький, тісний
complete *v* — закінчувати
control *v* — керувати, контролювати
depend on *v* — залежати від
fast *a* **—** швидкий
generation *n* — покоління
go on v — продовжувати (ся)
machine-tool *n* — верстат
matter *n* **—** питання, справа, предмет
ordinary *adj* — звичайний
perform v — виконувати, робити
quality *n* — якість
reliable *a* — надійний
require *v* **—** вимагати
speed *n* — швидкість
surround *v* — оточувати
task *n* — завдання, задача
up to *prp* — аж до, до самого, на рівні
usage *n* **—** використання
whereas *conj* — тоді як

Text 6A

Прочитайте та перекладіть текст

Today the word «electronics» is in general usage. Millions of people have electron watches. There are a lot of various radio and TV sets, video cassette recorders and CD players in our houses. In factories and plants we are surrounded with electronically controlled machines and instruments, we are carried by airplanes, ships, trains and cars with built-in electronic devices, and satellites circle the globe. In other words, we are living in an electronic world.

And the center of this world is a tiny silicon plate[1] of a few square millimetres, an integrated circuit[2], or a chip[3], as it is more commonly known. The integrated circuit is undoubtedly one of the most sophisticated[4] inventions of man, science and technology. It is in the heart of every electronic device and the more cassette recorders, TV sets and computers we need, the more integrated circuits are required.

When we speak about a further development of computers we mean not only quantity, but also high technology[5] and high speed. As the operation of an integrated circuit depends on microscopic «components», the purity of all

materials and the cleanness at the plant they are produced at must be of the highest quality. A continuous search is going on in laboratories throughout the world for more perfect, reliable and high speed electronic circuits.

In the past it took[6] scientists and researchers a whole lifetime to make a few thousand calculations, whereas for a modern computer this task is a matter of a few seconds. At present computers capable of performing billions of operations a second are required. Supercomputers are different from ordinary computers. The ordinary computer does the computations operation by operation, while the supercomputer operates like a brain: all operations are being done simultaneously.

In the next few years engineers will complete the work on computers of above 2 billion operations a second. It will take a few more years to produce a 10-billion operations computer. The fifth-generation computers performing 100 billion operations a second will become available in the near future. Is there an end to this race?

According to some researchers, we are close to what can be regarded as a true physical limit. But other specialists think that photons will make the operation a thousand times faster. This means that in the future it will be possible to expect the appearance of photon computers and that computations will be done by means of light. Light has several advantages over electronics: light beams are faster, travel in parallel lines and can pass through one another without interference[7]. Already, the optical equivalent of a transistor has been produced, and intensive research on optical-electronic computers is being carried out in a number of countries around the world. In a few decades a new age of light may replace the still youthful electronic age. The race is going on.

Notes to the Text

1. silicon plate — кремнієва пластина
2. integrated circuit — інтегральна схема
3. chip — кристал
4. sophisticated — складний
5. high technology — передова технологія
6. it takes ... (one year) — займає
7. interference — взаємовплив, завада

ВПРАВИ

Вправа 9. Прогляньте текст 6А і дайте відповіді на запитання.

1. What is this text about? 2. What new things appeared in people's everyday life after World War II? 3. What is at the center of all these things? 4. What applications of computers do you know? 5.Where else (ще) may

computers be used? 6. How does an ordinary computer (a supercomputer) operate? 7. What is the speed of a new supercomputer? 8. What is the task of engineers in the field of computer development? 9. What types of computers do you know? 10. What are the prospects in the development of computers?

Вправа 10. Вкажіть, які з наведених речень відповідають змісту тексту 6A.

1. Nowadays an integrated circuit is the main component of everyday device. 2. Supercomputers are in general usage now. 3. The operation of integrated circuits depends on their microscopic component quality. 4. Some researchers think that we are close to a physical limit in increasing computer operation speed. 5. Supercomputers are similar to ordinary computers. 6. By the beginning of the 21st century the electronic age may replace the light age. 7. It is possible to expect the appearance of optical-electronic computers in the future.

Вправа 11. Перекладіть речення, звертаючи увагу на різні форми герундія.

1. Watching football matches may be exciting enough, but of course it is more exciting playing football. 2. She stopped coming to see us, and I wondered what had happened to her. 3. Can you remember having seen the man before? 4. She was terrified of having to speak to anybody, and even more, of being spoken to. 5. He was on the point of leaving the club, as the porter stopped him. 6. After being corrected by the teacher, the students papers were returned to them. 7. I wondered at my mother`s having allowed the journey. 8. I understand perfectly your wishing to start the work at once. 9. Everybody will discuss the event, there is no preventing it. 10. At last he broke the silence by inviting everybody to walk into the dinning-room. 11. On being told the news she turned pale. 12. the place is worth visiting.

Вправа 12. Розкрийте дужки, вживаючи необхідну форму герундія.

1. Excuse me for (to break) your beautiful vase. 2. You never mentioned (to be) to Greece. 3. She was proud of (to award) the cup of a champion. 4. I don`t remember ever (to meet) your sister. 5. The cat was punished for (to break) the cup. 6. The cat was afraid of (to punish) and hid itself under the sofa. 7. I am quite serious in (to say) that I don`t want to go abroad. 8. She confessed to (to forget) to send the letter. 9. After thoroughly (to examine) the student, the professor gowe hin a satisfactory mark. 10. She reproached me for (not to write) to her. 11. Why do you avoid (to speak) to me? 12. The results of the experiment must be checked and re-checked before (to publish).

ВПРАВИ ДЛЯ САМОСТІЙНОЇ РОБОТИ

Вправа 13. Утворіть прикметники від дієслів або іменників за зразком:

move — рухати(ся) - movable — рухливий
comfort, change, compare, control, program, measure.

Вправа 14. Визначте, до якої частини мови належать слова.

reliable, elongate, percentage, stabilizer, stabilize, prospective, carrier, brilliant, relativity, intelligent, intelligence, assistance, fuselage, mainly, encircle, departure, statement, hypersonic, liner, horizontal, powerful.

Вправа 15. Знайдіть англійські еквіваленти наведених нижче українських слів.

конструктор — design, designer, to design
стабілізувати — stabilizer, stability, stabilize
найпізніший — latest, late, later
ефективний — efficient, efficiency, efficiently
характеристика, робота — perform, performing, performance
надійно — reliable, reliability, reliably
неймовірний — thinking, thinkable, unthinkable
невагомість — weightlessness, weightless, weight

Вправа 16. Визначте, синонімами чи антонімами є наведені пари слів.

advantage — disadvantage; to remain — to stay; reliable — unreliable; fast- slow; apart from — besides, in addition; capable — incapable; to begin — to start; liquid — solid; to cool — to heat; possible — impossible; weak — strong; to build — to break; aircraft — plane; engine — motor.

Вправа 17. Перекладіть та запам’ятайте виділені слова і словосполучення.

1. At higher schools specialization **generally** begins in the third year. 2. Nowadays we **generally** have computers at every plant. 3. This doesn't improve the speed of transport vehicles **in general** and that of an automobile **in particular. 4.** The **general** principles of the design of new transport machines **in general** and diesel locomotives **in particular** can be found in the new magazine. 5. The fifth-**generation** computers performing 100 billion operations

a second will become available in the near future. 6. Because of the extreme temperatures **generated** by atmospheric friction a craft will require protection. 7.The **generation** of electric power increases every year.

Вправа 18. Визначте, якою частиною мови є в реченні виділене слово. Перекладіть.

1. Television has a great number of **uses** nowadays. 2. This car **uses** a new sensor mechanism. 3. A. Bell wanted to build a mechanism that people could **use** to talk to one another over long distances. 4. The new material can be applied in manufacturing components much smaller than those **in use** today. 5. The Library of Congress serves not only Members of the Congress, but researchers and scientists who **use** it. 6. **Measures** to keep Kyiv's air clean are important components of our ecological programme. 7. A thermometer is a device that **measures** temperature. 8. Computers can do many things, they can **control** machines in factories, cars on roads, play chess and so on. 9. Computers **control** nearly everything we do in the modern world. 10. Today dirigibles are equipped with electronic **controls.**

Вправа 19. Виберіть відповідне дієслово.

1. The car has ... (brought, brought about) mobility to millions of people, but at the same time polluted the atmosphere. 2. The scientific and technological achievements ... (brought, brought about) great changes in people's life and work. 3. A lot of people came to ... (look at, look for) a new invention, the television set, at the World Fair in New York. 4. It was necessary ... (to look at, to look for) a more reliable method of calculation. 5. The airplane «Ruslan» can ... (carry, carry out) up to 150 tons. 6. Research is being ... (carried, carried out) for developing new composite materials to lighten aircraft structure.

Вправа 20. Прочитайте та перекладіть без словника.

Let's look at the progress the computers have made in their development. Besides the great changes in size and speed, we now have machines which change numbers into pictures, words and sounds. The next big change will be when we get computers that will understand human language. But now if you want to programme your own computer, you must learn its language. It does not understand yours. For example you talk with an Englishman. You make one small grammar mistake «have» instead of «has». The man understands what you mean and the talk goes on. But if you make even the smallest mistake in computer language, the talk breaks down and you must go back to the beginning.

CONVERSATION

Exercise 1. Answer the questions.

1. What influences the operation of an integrated circuit? (the quality of microscopic components it consists of) 2. What is the function of a computer? (making a great number of calculations at a very high speed) 3. What will be the speed of the fifth-generation computers? (100 billion operations a second) 4. What can increase the operation speed many times compared to the present computers? (a photon) 5. What physical phenomenon can be used to improve a computer's speed? (light) 6. What are the advantages of light for computation purposes over electronics? (the capability to move faster, in parallel lines and pass one another).

Exercise 2. Make a sentence out of the two parts.

1. Nowadays electronic devices	1. airplanes, ships, trains and cars having built-in electronic circuits and instruments.
2. We are surrounded	2. is being used more widely at home and in office.
3. There are	3. without electronically controlled machine-tools.
4. A personal computer	4. with electronics everywhere in everyday life and at plants and factories.
5. People are carried by	5. scientific research without computers.
6. The modern production is unthinkable	6. are in general usage.
7. It is impossible to imagine	7. electronic watches we wear, telephone, radio, and TV sets we speak, listen to and watch.

Exercise 3. Read and learn.

Computers

Mary: Have you seen an interesting advertisement in the last issue of «The Economist»?

John: I have not read it yet.

M.: The School of Engineering offers a new programme in information system. Applications are invited for jobs in this field.

J.: Professor Smith has told me about it. This programme is interesting. It is designed to meet the needs of persons with a computing background for their work in management and industry.

M.: Don't you think that our son can lecture on this new programme?

J.: Why not? He graduated from the Department of Computer Science and for some years was taking part in the research project connected with the problems of supercomputers and their manufacturing.

M.: As far as I remember his research interests cover software and application.

J.: And what do they say about the contract?

M.: It is a three years' contract and it may be extended for further two years. I'll write Mike a letter.

J.: It's too long. You'd better call him

****

A.: How do you like these new electronic games?

B.: I am crazy (mad) about them. And you?

A.: Really, I don't know what you see in them.

B.: Well, I think a real computer game resembles real life as closely as possible, doesn't it?

A.: May be you are right, but I am not sure.

B.: Oh, but I find them rather relaxing for a change and try to spend every spare minute playing.

Text 6B

Computers Concern You

When Ch. Babbage, a professor of mathematics at Cambridge University, invented the first calculating machine in 1812, he could hardly have imagined the situations we find ourselvesin today. Almost everything in modern world is done with the help of computers — the complicated descendants of his simple machine. Computers are being used more and more extensively in the world today, for the simple reason that they are far more efficient than human beings. They have much better memories and can store great amount of information and they can do calculations in a fraction of the time required by a human mathematician. No man alive can do 500,000 sums in one second, but a modern computer can.

In fact, computers can do many things we do, but faster and better. They can control machines at factories, work out tomorrow's weather and even play chess, write poetry or compose music. Let's look now at some of the ways in which computers concern people in their daily lives and work.

Many people associate computers with the world of science and mathematics, but they are also a great help to scholars in other subjects: in history, literature and so on. It is now possible for a scholar to find a book or an article he needs very quickly, which nowadays when a million or more new books are published each year is quite an advantage. You tell the computer which subject you are interested in and it produces any microfiche you need in seconds.

There are also systems which are being developed to translate articles from foreign magazines by computer and to make up many lists of information which are needed in a modern library. So, computer can help us to deal with the knowledge explosion in many ways. One can imagine a time when libraries will be run by computers, without human beings at all.

Or, let's take another example. When a man drives a car for long distances he has two problems: to keep the car at a constant speed and watch that he does not run into the car in front of him: Engineers are now experimenting with a system which has a computer control of these two problems. The car's computer keeps the speed constant. At the same time the distance between the car and any other car in front of it is measured by a beam of light transmitted forwards. The beam meets the rear reflectors of the car in front and it is reflected back, which enables to measure the distance. This information is fed to the computer which adjusts its speed control accordingly.

Текст 6С

Sir Isaac Newton was a supergenius of science who among other things invented calculus (обчислення), stated the laws of gravity and optics. But it turned out Newton also made mistakes. The University of Chicago announced recently that R. Garusto, a physicist, had discovered in one of Newton's calculations an error that had been undetected for three centuries.

The young scientist discovered it while he was studying Newton's masterpiece (шедевр) of physics «Principia» (1687). Newton had derived a figure for the Earth's mass based on his new theory that a single force — gravity — governed falling bodies on the Earth and the motion of planets around the Sun. The calculation depended on the angle between two lines from the Earth to the Sun, but because that angle was not exactly known at the time, Newton used slightly different figures in «Principia». It was that mistake that the young scientist found, a discovery that was soon confirmed (підтвердити) by other physicists. The mistake has no influence on Newton's theory, but its discovery was enough to get him a prize from the University of Chicago.

Text 6D

New York

Situated at the mouth of the deep Hudson River, New York has always been the gate of the USA. But it is more than just a door: it is also a window through which the life of the whole nation may be observed. New York is a city of striking social contrasts. It is a place where most of the millionaires live and at the same time a greater proportion of New Yorkers live at a lower level than the average for the US. In 1626 Dutch colonists set up here the first settlement, named New Amsterdam. They bought Manhattan Island from Indians for 24 dollars and a barrel of rum. The Americans say that it was the best business deal ever made in New York. In 1664 the colony was captured by British fleet under Duke of York and renamed New York,

Now New York includes five boroughs: Manhattan, the Bronx, Queens, Brooklyn and Richmond.

Manhattan is the smallest of the five city boroughs in size and it is not the largest in population although the majority spend a considerable part of the day in this center of business life. Here are Broadway, Wall Street and the Stock Exchange. This is the heart and source of American policy.

Harlem is also in Manhattan. Thick walls separate this «Black Bottom» with 450,000 coloured people from the white population.

In the bay stands the bronze Statue of Liberty given to the United States by France as a present in 1886. Its torch is 60 meters high and can be seen at night for many miles. A new American Museum of Immigration is open at the base of the Statue.

The Bronx is a more residential rather than industrial part of the city. The well-known Zoo and Botanic Gardens are in the Bronx.

Queens is both a residential and industrial area. New York's two biggest airports are both there.

The Brooklyn Navy Yard is the largest naval shipbuilding center in the world. Brooklyn has more people than any other part of the city — about 3,000,000. It is mostly a district of middle-class people.

Richmond is the borough of piers and warehouses. Its population is only 200,000.

What makes New York? First of all, it is a great seaport, the greatest in the USA. The sea encircles many of the city areas. It is also a great financial center, where «money-making» is the main law of life. It is the symbol of big business and its Wall Street has become a nickname for big monopolies all over the world. New York is the leading textile center of the country and its clothes industry. It has a considerable printing industry and many book-shops. It is also undoubtedly one of the centres of social and spiritual life of America. There are a lot of Art Galleries, among them rich Henry Frick collections, and many

impressive art museums (Metropolitan Museum, Modern Art Museum, American Art Museum and others). For a long time New York specialized in giving visitors a good time at its theatres, restaurants, night clubs, sporting arenas, and therefore has a large hotel industry. It is the main publishing, advertising and radio center with Columbia and New York universities and various city colleges.

Among the inhabitants of New York one can meet people of almost all nations. The population of New York numbers about 16 million. The citizens speak seventy-five different languages.

LESSON 7

Умовні підрядні речення
Значення слова *provide*
Суфікси *-th, -en*
Префікси *sub-, under-, non-*
Text 7A. *The Technology within an Industrial Robot*
Text 7B. *Greenwich*

Вправа 1. Визначте тип умовного підрядного речення, перекладіть.

1. If we look around, we can see that electricity is serving us in one way or another. 2. If I were free, I should help you with pleasure. 3. If we had tested this material, we should have used it in our work. 4. If ordinary gases are greatly compressed, they become liquids. 5. If supercomputers had not been used for thermodynamic calculations, designers would have spent all their lives on computations. 6. If you think that a computer never makes mistakes, you are wrong. 7. If extreme temperatures generated by atmospheric friction were not so high, a hypersonic craft would not require complicated cooling measures. 8. If we had been told about the lecture on reliability in spacecraft production, we should have come by all means. 9. Superconductivity can be obtained in some materials if the temperature is very low and close to absolute zero.

Вправа 2. Поставте дієслово в дужках у відповідну форму.

1. It you (to know) English well, you will be able to read books in the original. 2. If I get this book, I (to be) very happy. 3. You (to become) much stronger if you did your morning exercises regularly. 4. If she went to work in France, she (to learn) French very quickly. 5. If he (to see) her, he would have spoken to her. 6. I (to help) them if I had been at home. 7. You (to write) the testwork well if you have learnt grammar. 8. If she (to ask) me yesterday, I should have told her about it. 9. If we had not been present at the lecture, we (not to understand) the new approach to the solution of the problem.

Вправа 3. Закінчіть речення.

1. I would work much better if... . 2. Life would be much simpler if... . 3. Use every opportunity to practice English if... . 4. I would have started to study English earlier, if... . 5. I would have had more opportunities, if ... .

Вправа 4. Перетворіть речення відповідно до зразка.

If I were free, I should help you. Were I free, I should help you.

If he had known about the lecture, he would have come. Had he known about the lecture, he would have come.

1. If it were possible, we should begin this work at once. 2. Ifhe had had all the necessary books, he would have made his report in time. 3. If the books had been available in our library, we could have done this work much earlier. 4. If there were no computers, space flights would be impossible. 5. If drivers were more attentive while driving, there would be less accidents on the road.

Вправа 5. Перекладіть речення та запам'ятайте значення дієслова *to provide* та сполучника *provided.*

1. The experiments conducted provided very good results 2. A tire pressure display provides information for front and back pairs of tires. 3. Provided new composite materials are used, it will be possible to reduce overall aircraft weight. 4. Provided with a new vacuum-controlled carburetor this car model has several important advantages. 5. Superliners could develop a higher speed provided some special cooling measures were used. 6. An aircraft pilot can get all the information he needs provided he contacts a radio navigation station. 7. The work done provided us with new data. 8. Having measured the distance between two points, it is possible to calculate the time during which a car can cover it provided we know the car's average speed. 9. Our laboratory has been provided with the latest equipment.

СЛОВОТВОРЕННЯ

Вправа 6. Перекладіть наведені похідні слова відповідно до зразка:

прикметник + **th** — *іменник,*

deep — *глибокий* → **depth** — *глибина*

length, width, strength;

прикметник+ **en** = *дієслово*

light — *легкий* → **to lighten** — *полегшувати*

deepen, brighten, lessen;

префікси **sub- (під-, суб-), under- (під-, недо-)**

submerge — *затоплювати, занурювати(ся)* → **submersible** — *підводный,*

estimate — *оцінювати* → **underestimate** — *недооцінити*

subsystem, subsonic, subcommittee, subdivision, subsurface, submarine, undersea, underground, undercooling, underproduction, underdeveloped;

префікс **non- (не-)**

non-conductor, non-military, non-effective, non-essential, non-standard, non-metal, non-stop.

Вправа 7. Прочитайте та перекладіть інтернаціональні слова.

ocean ['quSqn], container, apparatus ["xpq'reItqs], machine [mq'SJn], spherical ['sferIkql], plastic, metal platform, helicopter ['helIkOptq], manoeuvre [mq'nHvq], sport, mechanical [mI'kxnIkql], manipulator [mq'nIpjuleItq], system, miniature ['mInjqCa], microphone ['maIkrqfqun], to lift, minerals, battery, stereo ['stIqrIqu], construct, cultivate, videocamera, titanium [taI'teInjqm].

Вправа 8. Прочитайте та звпам'тайте вимову наступних слів.

descend [dI'send], legend ['leGqnd], submerge [sqb'mWG], submersible [sqb'mWsIbl], da Vinci ['vInCI], national ['nxSqnl], Geneva [GI'nJvq], Japanese ["Gxpq'nJz], technician [tek'nISqn], extreme [Iks'trJm], precision [prI'sIZqn], essentially [I'senSqlI], cycloid ['saIklOId], particular [pq'tIkjulq], wrist [rIst], provide [prq'vaId], sample ['sRmpl], image ['ImIG], scale [skeIl], join [GOIn], politician ["pOlI'tISqn].

СЛОВА ТА СЛОВОСПОЛУЧЕННЯ ДЛЯ ЗАПАМ'ЯТОВУВАННЯ

extension *n* — розширення
device *n* — прилад
application *n* — застосування, вживання
feature *n* — характеристика
similar *adj* — подібний
capable *adj* — здатний
accuracy *n* — точність
maintain *v* — утримувати, обслуговувати
perform *v* — виконувати, робити
handling *pres.p.* — керуючий, регулюючий
realiability *n* — надійність
obtain *v* — отримувати
consider *v* — розглядати, обговорювати
assign *v* — призначати
expect *v* — чекати, сподіватися, розраховувати

Text 7A

Прочитайте і перекладіть текст.

The Technology within an Industrial Robot

An industrial robot may be defined as a device with five or more axes with servo-control, capable of being programmed for independent operation. Typically, two or three of these axes may be for a hand, gripper or wrist type of mechanism, and the others for what can be considered a shoulder and arm, giving variable extension, rotation, and elevation. However, there are no hard

and fast rules as to what form an industrial robot must take, and their mechanical configurations differ considerably depending on makers.

Even now robots are unique products for all mechanical engineers across the world. Therefore the term "robot" itself requires clarification. Some engineers insisted even until recently that every robot must by all means be like us, people, and be capable of doing any job. Others were inclined to regard any manipulating device as a robot. The standard adopted in many countries defines an industrial robot as automated machine combining a manipulator and programmable control device designed to perform movement and control functions substituting for similar functions of man.

The technology within a robot is really well established from other branches of engineering. It is the detailed application of such technology to a robot that is different. Many features of NC machine tools, for example, can be compared directly with similar features of an industrial robot. The servo-systems for controlling the axes, the minicomputer controller, and memory of tape programming are all established features of existing machine-tool technology, and often the machine tool itself has adopted the technology from other previous developments. There is, therefore, plenty of application experience for robot control designers to draw upon.

The servo-drives for the axes may be pneumatic, hydraulic, or electric, or any combination of these methods. Pneumatic systems are not generally capable of very high accuracy of movement due to the compressibility of air, but they are of low cost and easy to maintain. Hydraulic drives have the capability of providing high forces and good control of speed and positioning. Electrically, stepping motors or dc drives can be used.

The detailed mechanical design of an industrial robot is somewhat different from a machine tool. Industrial robots usually have a hand or wrist incorporating some form of gripper unit. Gripper units have been used in the nuclear machining for many years for the remote machining of radioactive or toxic materials. Such units were designed to perform a range of tasks, not just one simple handling operation. Simpler gripper units have been developed for handling tooling as part of automatic tool changers. There exist many types of gripper units and transfer mechanisms.

From these examples, it can be seen, that there is little new in the technology of industrial robots, and the high levels of reliability obtained in the practical application of robots perhaps reflects this fact. The innovation lies rather in the application of the technology of robots, and it is here that invention and novelty must be considered.

What makes a robot different from an ordinary machine is its electronic brain — a microcomputer that can be programmed to do an assigned task repeatedly, at the same pace and with the same accuracy. It is expected that in the nearest future industrial robots will be able to change their own parts.

Notes to the Text

1. elevation — піднесення
2. programmable control device — пристрій з програмованим керуванням
3. NC machine tool — верстат з числовим програмним керуванням (ЧПК)
4. servo-drive — сервопривід
5. to draw upon — черпати, брати
6. positioning — позиціонування
7. dc (direct current) drive—привод постійного струму
8. stepping motor — крокуючий двигун
9. gripper unit — затискний пристрій
10. nuclear machining — механічна обробка радіоактивних матеріалів
11. remote machining — механічна обробка за допомогою дистанційного управління
12. automatic tool changer — пристрій для автоматичного змінювання іструменту.

ВПРАВИ

Вправа 9. Перекладіть. Знайдіть умовні підрядні речення, що виражають нереальну дію.

1. If a scientific research is closely linked with practice, the results are always good. 2. If you looked at the equipment of 1946, you would notice the difference with that available at present. 3. If there is a pressure change in the tires, a transmitter signals to adjust the pressure. 4. If we were to make a journey in a plane to the nearest star, we should have to travel for several thousand centuries. 5. Were traffic controlled by computers, cars could travel with safety and speed. 6. Had submersibles been developed since the time of Alexander the Great, mankind would have used natural resources from the ocean floor and cultivated plants and fish there. 7. Had all submersibles had autonomous principle of operation, they would have become much more useful. 8. If fire-arms had not been invented, the secret of Damascus steel would not have been lost. 9. If we could make a non-stop flight around the sun in an airplane at a speed about 300 km per hour, it would require 565 days to encircle it at the equator. 10. If the satellite speed is less than necessary, it will go down from the orbit and enter the atmosphere.

Вправа 10. Перекладіть речення, звертаючи увагу на значення слів *provide, if (whether).*

1. Specialists reported that a miniature video camera provided the latest submersible with vision. 2. The speed of a satellite would be less provided it moved at a greater distance from the Earth. 3. Drivers don't know yet whether radars will be mounted on the next car models. 4. If the weather is too bad for flying, passenger airplanes don't leave airports. 5. It was very important to find out if electricity could be used for long distance communication. 6. During the entire flight, the pilot is provided with all the necessary information about weather conditions. 7. Modern submersibles can remain at the depth of 20,000 feet for eight hours or, if needed, as long as two or three days. 8. A new system for motor cars can be provided with infrared sensors that can detect a human figure at night. 9. If underwater tourism continued to develop at the present rate, the number of passengers could grow up to millions in only a few years.

Вправа 11. Перекладіть речення із сполучником *unless* та запам’ятайте особливості його перекладу.

1. Isaac Newton stated that a body would continue moving unless some force was applied to stop it. 2. Space flights would be impossible unless special materials for space vehicles were produced. 3. We should have no radio, telephone, television or computers unless there were electricity. 4. The earth temperature would increase indefinitely unless heat were radiated. 5. Unless the temperature rises, the speed of the molecules will not increase. 6. It would have been impossible to send satellites into orbit unless Newton's laws of motion had been studied. 7. With heat generated by friction of the air on aircraft surface, the temperature inside the cabin would increase to almost 1,000 ˚C unless it were cooled by mechanical means.

Вправа 12. Перекладіть наведені умовні речення.

1. Single robots are not effective, unless they are introduced within a robotized complex system. 2. Unless scientists have studied the principles of the functioning of the human brain, they will not be able to tackle the problem of artificial intellect. 3. Automation will not be used by production if it does not bring profit. 4. Provided we use the necessary instruments, the measurement will always be correct. 5. In forge and press shops robots feed blanks, measuring their temperature in passing, if this is required by the technology.

ВПРАВИ ДЛЯ САМОСТІЙНОЇ РОБОТИ

Вправа 13. Знайдіть:

а) синоніми
to finish, to work, craft, to build, vehicle, to operate, rapid, fast, to construct, to complete;

б) антоніми
to lift, difficult, to complete, after, to descend, before, easy, to start.

Вправа 14. Прочитайте та перекладіть без словника.

Deep Trouble

An experimental undersea telephone cable in the Canary Is lands had to be lifted from the ocean floor three times because of breakage. Each time sharks' (акула) teeth were found in the damaged cable. Though the cable contains optical fibres transmitting signals in the form of light, it carries a very small amount of electrical wires. It is known that electricity attracts sharks. Therefore, ordinary electric power cables are usually provided with some kind of protection to stop their being attacked by sharks. However, it was not expected that it was necessary to mount this expensive protection on the new cable. But provided the designers had used this conventional protection on the new cable, the sharks would not have approached it.

Tea

The English know how to make tea and what it does for you. Seven cups of it wake you up in the morning; nine cups will put you to sleep at night.

If you are hot, tea will cool you off, and if you are cold, it will warm you up.

If you take it in the middle of the morning, it will stimulate you for further work; if you drink it in the afternoon, it will relax you for further thought. Then, of course, you drink lots of it in off hours (вільний час).

The test of good tea is simple. If a spoon stands in it, then it is strong enough.

1. If you ask me, tea...
2. If you want my opinion, tea...
3. I entirely / quite agree with the idea that...
4. That's exactly my opinion / that's exactly what I feel...
5. I don't like tea because...

Text 7B

Greenwich

Greenwich is on the river Thames, five miles from the middle of London, and its story is 2,000 years old. The first English people — the Saxons — were fishermen there and they gave Greenwich its name — «the green village».

You can still walk along the old Roman road in Greenwich park. But the river was the true road to the outside world for the Romans and for English kings and queens who later lived in Greenwich.

The King Henry VIII loved this place. He knew that England must be strong at sea. So two big shipyards were started at Greenwich and for 350 years the ships made there were the best in the world.

Many ships were lost at sea — their sailors did not know how to tell exactly where they were.

In the 17th century astronomer Flamstead tried to find the answer. He worked in an Observatory on the high ground in Greenwich park. The walls of its big light-sided room shook

when the weather was bad. But from it, with a telescope made by himself, Flamstead could look all round the sky. And he did look night after night for twenty years. Carrying on Flamstead's work a hundred years later, an astronomer called Harrison finally made a clock which told the time at sea and helped sailors to know where they were. You can see Harrison's clock, still working in Greenwich museum of the sea. Because of Flamstead's work every country in the world now tells its time by Greenwich time.

Every year a million people come to Greenwich to see its museums and palaces and its two famous ships: one old, one new. Both the big CUTTY SARK and the little GYPSY MOTH sailed through dangerous waters before they came safely back to their Greenwich home. At the end of the 1800's the CUTTY SARK was the fastest ship of its size. Carrying more than a million kilos of tea, she travelled the 25,000 kilometeres from China to England in only hundred days.

Next to the CUTTY SARK is the GYPSY MOTH - only 16.5 metres long, but full of newest equipment. Her captain Sir F. Chichester wanted his ship to sail as far and as fast as the CUTTY SARK. When he sailed round the world by himself in CYPSY MOTH in 1966 — the first man ever to do this - he took a flag from the CUTTY SARK with him.

LESSON 8

Інфінітив, форми і функції
Конструкція *there + присудок*
Дієслова *to cause, to make, to force*
Text 8A. *Laser*
Text 8B. *Optical Technology*
Text 8C. *An Encyclopedia on a Tiny Crystal*

Вправа 1. Визначте функцію інфінітива в реченнях, перекладіть їх.

1. To develop the supercomputer, highly developed electronics and new materials were required. 2. One of the best ways to keep the car speed steady is to use a computer. 3. Experiments helped Mendeleev to discover the properties of new chemical elements. 4. Francis Chichester was the first to sail round the world by himself. 5. Some materials with new useful properties may be produced in space. 6. A special electronic device signals the engine to stop. 7. Radar may control the brakes to avoid collisions with other cars. 8. High temperature alloys make it possible for jet engines to be operating under severe conditions for a long period of time. 9. Recently a radar to be mounted on cars has been developed. 10. In a new Japanese car the information to be received by the driver will come through a navigation earth satellite. 11. To help helicopters and aircraft find the capsule, its upper part is covered with special paint which can be detected by radar. 12. To detect objects at a distance such as ships, aircrafts, buildings, mountains, etc. is of great importance for navigation both at sea and in air. 13. The radar detects the stationary objects ahead of the car to warn the driver about them and slow down the speed. 14. We had fresh water to drink. 15. They returned to listen about our accident and help. 16. He asked permission to leave.

Вправа 2. Перекладіть за зразком:

There are many ways ... — Існує багато способів ...
There has appeared a new kind of vehicle. — З'явився новий вид апарата.
There is no doubt... — Немає сумніву ...

1.There are unique conditions in space for producing materials with special qualities. 2. There exist different designs of submersible crafts in several countries. 3. There remains one more test to be carried out before using the device. 4. There has recently appeared a new way of communication through satellite networks. 5. There is no doubt that soon we shall see the appearance of

a new kind of superliners and space crafts. 6. We have read that there exists an international organization that makes it possible to keep telephone and telegraph communication via satellite with ships in any part of the World Ocean. 7. There is no doubt that mankind will be able to explore the solar system by using nuclear rockets. But there still remain a lot of problems to be solved.

Вправа 3. Перекладіть речення і запам'ятайте значення дієслів *to cause, to make, to force.*

1. Weather changes are often caused by cyclones and anticyclones. 2. Work with deaf people made Al. Bell look for a way to help them and he began to study the theory of sound. 3. In internal combustion engines the pressure of gases forces the piston to go down. 4. The fact that Sofia Kovalevskaya couldn't continue her studies in Russia made her leave for Germany. 5. Heating causes the motion of molecules in a substance, the hotter it becomes, the quicker the molecules move. 6. Morse's interest in electricity made him start experimenting with it. 7. Sometimes bad weather forces the aircrafts to land. 8. In ordinary air it is possible to make electrons jump through space by means of pressure of high voltage. 9. The manager made Mary copy the report again. 10. They made him wait for an hour.

Вправа 4. Прочитайте та перекладіть інтернаціональні слова

fantastic [fxn'txstIk], Martians ['mRSjqnz], to stimulate ['stImjuleIt], laser ['leIzq], colour ['kAlq], thermonuclear reaction, controlled thermonuclear reaction, energy, plasma ['plxzmq], dozens ['dAznz], practice ['prxktIs], practical ['prxktIkql], potential [pqu'tenSql], intensive, intensity, principle, to vibrate [vaI'breIt], fraction, project ['prOGekt], transmission, solar transmission, realise ['rIqlaIz], effect [I'fekt], Encyclopaedia [en"saIklqu'pJdjq].

Вправа 5. Прочитайте і запам'ятайте вимову слів.

world [wWld], turn [tWn], earth [WT], invade [In'veId], sword [sLd], heat [hJt], beam [bJm], pure [pjuq], mankind [mxn'kaInd], enough [I'nAf], vaporize ['veIpqraIz], lead [led], focused ['fqukqst], treatment ['trJtmqnt], vary ['vFqrI], varied ['vFqrId], suggest [sq'Gest], magic ['mxGIk], problem ['prOblqm], combine [kOm'baIn], source [sLs], contribute [kqn'trIbjHt], duration [djuq'reISqn], pulse [pAls], though [Dqu], encounter [In'kauntq], encode [In'kqud], surface ['sWfIs], therefore ['DFqfL], doubt [daut], entire [In'taIq], weapon ['wepqn].

СЛОВА ТА СЛОВОСПОЛУЧЕННЯ ДЛЯ ЗАПАМ’ЯТОВУВАННЯ

amplification *n* — підсилення
as well *adv* — також
approximately *adv* — приблизно
capacity *n* — ємність, здатність
conduct v — проводити
cost *n* — ціна, вартість
duration *n* — тривалість
enough *adv* — досить
entire *a* — цілий, повний
fulfilment *n* — виконання, здійснення
single *a* — єдиний
suggest *v* — пропонувати
tool *n* — інструмент, знаряддя
heat *v* — нагрівати; *n* — теплота, спека
heating *n* — нагрівання
indeed *adv* — дійсно
installation *n* — встановлення
rapidly *adv* — швидко
represent *v* — представляти
stimulate *v* — стимулювати
treatment *n* — обробка
vary v — змінювати(ся), міняти
weapon *n* — зброя
to meet the demands, the requirements— задовольняти вимоги
in order to — для того, щоб

Text 8A

Прочитайте текст і знайдіть абзаци, де говориться про застосування лазерів. Перекладіть.

Laser

In the «War of Worlds» written before the turn of the last century H. Wells told a fantastic story of how Martians almost invaded our Earth. Their weapon was a mysterious «sword of heat». Today Wells' sword of heat has come to reality in the laser. The name stands for light amplification by stimulated emission of radiation.

Laser, one of the most sophisticated inventions of man, produces an intensive beam of light of a very pure single colour. It represents the fulfilment of one of the mankind's oldest dreams of technology to provide[1] a light beam intensive enough to vaporize the hardest and most heat-resistant materials. It can indeed make lead run like water, or, when focused, it can vaporize any substance on the earth. There is no material unamenable[2] to laser treatment and laser will become one of the main technological tools quite soon.

The applications of laser in industry and science are so many and so varied as to suggest magic[3]. Scientists in many countries are working at a very interesting problem: combining the two big technological discoveries of the second half of the 20th century — laser and thermonuclear reaction — to produce a practically limitless source of energy. Physicists of this country have developed large laser installations to conduct physical experiments in heating thermonuclear fuel with laser beams. There also exists an idea to use laser for solving the problem of controlled thermonuclear reaction. The laser beam must heat the fuel to the required temperature so quickly that the plasma does not have time-to disintegrate. According to current estimates, the duration of the pulse has to be approximately a billionth of a second. The light capacity of this pulse would be dozens of times greater than the capacity of all the world's power plants. To meet such demands in practice, scientists and engineers must work hard as it is clear that a lot of difficulties are to be encountered on route[4].

The laser's most important potential may be its use in communications. The intensity of a laser can be rapidly changed to encode very complex signals.In principle, one laser beam, vibrating a billion times faster than ordinary radio waves, could carry the radio, TV and telephone messages of the world simultaneously. In just a fraction of a second, for example, one laser beam could transmit the entire text of the Encyclopaedia Britannica.

Besides, there are projects to use lasers for long distance communication and for transmission of energy to space stations, to the surface of the Moon or to planets in the Solar system. Projects have also been suggested to place lasers aboard Earth satellites nearer to the Sun in order to transform the solar radiation into laser beams, with this transformed energy subsequently transmitted to the

Earth or to other space bodies. These projects have not yet been put into effect[5], because of the great technological difficulties to be overcome and, therefore, the great cost involved. But there is no doubt that in time[6] these projects will be realized and the laser beam will begin operating in outer space as well.

Notes to the Text

1. to provide — отримувати
2. unamenable — те, що не піддається
3. as to suggest magic — можна прийняти за чудо
4. on route — на шляху
5. put into effect — здійснти
6. in time — з часом

ВПРАВИ

Вправа 6. Дайте відповіді на питання до тексту 8А.

What is this text about? 2. What does the word «laser» mean? 3. What is the laser, is it a device or some phenomenon? 4. Who was the first to write about lasers? 5. What writer from this country wrote a book about a laser? 6. What can a laser do? 7. Where can it be used? 8. What other uses do you know?

Вправа 7. Вкажіть, які твердження відповідають змісту тексту 8А. Виправте неправильні твердження.

1. Laser means «light amplification by stimulated emission of radiation». 2. Laser produces an intensive beam of light. 3. In the next few years laser will become one of the main technological tools. 4. Martians almost invaded the Earth before the turn of the last century. 5. Laser and thermonuclear reaction can produce a limited source of energy. 6. The laser beam heats the fuel so quickly that the plasma disintegrates. 7. There are projects to transform lunar radiation into beams. 8. The laser beam will begin operating in outer space.

Вправа 8. Знайдіть в тексті 8А інфінітиви у функції частини присудка і обставини мети.

Вправа 9. Знайдіть речення з інфінітивом у функції означення і додатка, перекладіть.

1. To design, construct and operate a laser system is a great technological achievement. 2. To protect the water resources, forests and atmosphere, several laws were passed in Russia in the 1970s. 3. A very interesting problem is to

produce a practically limitless source of energy. 4. There are projects to use lasers for long distance communication. 5. Automation makes it possible to obtain and develop new sources of energy. 6. To combine laser and thermonuclear reaction is a very interesting problem for the scientists in many countries. 7. To conduct physical experiments with laser beams, Russian physicists have developed large laser installations. 8. Some Western experts consider that it is practically impossible to protect big cities from pollution. 9. Lasers to be placed on Earth satellites will transform solar radiation into laser beams. 10. A special design bureau in St. Petersburg was the first in the world to develop production of superlong escalators. 11. To put some projects with lasers in operation, great technological difficulties must be overcome. 12. One of the ways to make planes as economical as possible is to lighten the aircraft by using new composite materials. 13. Signals to be measured must be strong enough.

Вправа 10. Визначте, якою частиною мови є означення, перекладіть.

1. The new system developed increased the safety and efficiency of a car. 2. The laser's most important potential use may be its long distance communication applications. 3. Provided the problems of using laser for controlled thermonuclear reaction were solved, the capacity of the pulse received would be much greater than that of all the world's power plants. 4. All a pilot needs to do is to tune to radio transmitters and he will get direction signals he needs. 5. One of the problenjs scientists are working at is to transmit energy to space stations by using lasers. 6. Laser provides a light beam intensive enough to vaporize the hardest and most heat-resistant materials. 7. A hypersonic aircraft will require complicated cooling measures because of the extreme temperatures involved. 8. A new electronic device to be installed in the car's panel will calculate how far one can drive on the fuel left. 9. The hardest materials a laser beam is aimed at vaporize within a fraction of a second. 10. Aircraft designers are interested in all kinds of new materials that are strong enough to be used for high-speed airliners. 11. Noise and vibration are also the problems to be faced by designers of hypersonic crafts. 12. Besides, there is one more problem to be studied — that of surface cooling. 13. The ordinary aircraft windows would make the future superliner structure too weak to withstand great stresses developed. 14. Every student of Cambridge is to go to his tutor once a week to discuss with him the work done.

ВПРАВИ ДЛЯ САМОСТІЙНОЇ РОБОТИ

Вправа 11. Визначте частини мови за суфіксами і префіксами.

encode, capacity, disintegrate, emission, widen, intensive, incredible, defence, stranger, reality, strengthen, fulfilment, indestructible, amplification, substance, entirely, vaporize.

Вправа 12. Знайдіть українському слову відповідне англійське.

установлювати — installment, installation, install;
різниця — differ, difference, different;
розпадатися — disintegrator, disintegration, disintegrate;
те, що застосовується — application, applicable, apply;
укріплювати — strong, strength, strengthen;
ефективно — efficient, efficiency, efficiently;
підсилювач — amplification, amplifier, amplify.

Вправа 13. Знайдіть:

а) синоніми

rapidly, sophisticated, to conduct, demand, almost, quickly, to carry out, approximately, opportunity, requirement, also, use, to fulfill, complex, as well, to realize, application, possibility;

б) антоніми

further, integrate, cooling, outside, powerless, uncontrolled, limited, disintegrate, nearer, capable, limitless, controlled, incapable, powerful, heating, inside.

Вправа 14. Заповніть пропуски відповідною формою дієслова *to be*.

I ... now in the garage on Seventh Street. There ... three cars here. One ... a Ford. There ... a man in it. He ... buying a tire. One car ... a Buick. There ... five people in it. There ... a third car. A man and his wife ... in it. Their battery ... dead. The two battery men ... looking at it. «I ... sure you will have to rent a battery», one man says. «We ... a long way ftom home», the man in the car answers. «We .... not here often. We must buy a battery. There ... nothing else to do».

Вправа 15. Прочитайте і перекладіть без словника.

To understand why light from the laser is so concentrated, you must know that light travels in waves. Ordinary white light is made up of many wavelengths travelling in every direction. Laser light is essentially of one wavelength, with all the waves moving in one direction. Because the laser wavelengths intensify each other, they can remain in an unbelievably straight beam for a long distance. Almost any substance can be forced to «lase» if you work hard enough with it. Gas lasers give off continuous beams of light. Tiny semiconductor lasers may be especially useful in computers for transmitting signals to replace the use of cables. Many lasers can give off invisible radiation, either infrared or ultraviolet.

CONVERSATION

Exercise 1. Answer the questions.

1. What is a laser? (a device producing an intensive beam of light) 2. What is its principle of operation? (light amplification by stimulated emission of radiation) 3. What light is produced by a laser? (light of pure single colour) 4. What can be done by means of a laser? (vaporizing the hardest materials) 5. What materials can be treated with a laser? (practically any material and any substance) 6. What is the most promising use of lasers? (the use in all kinds of communication) 7. What prevents putting into effect the projects to use lasers more widely in space? (great technological difficulties and great cost involved)

Exercise 2. Make a sentence out of the two parts.

1. A laser can find	1. must heat the fuel to the required temperature very quickly.
2. It is very interesting to combine	2. very wide application.
3. There is an idea	3. hard to overcome numerous technological difficulties.
4. In this case a laser beam	4. is not an easy task.
5. The light capacity in a laser installation should be dozens of times greater	5. to use a laser for solving the problem of controlled thermonuclear reaction.
6. To develop such a laser system in practice	6. laser and thermonuclear reaction to produce a limitless source of energy.
7. Scientists and engineers must work	7. than the capacity of all the world's power plants.

Exercise 3. A. Read and learn.

I Want to Read Faster

Mary: I've read a detective story. It wasn't very good so I wasted (втрачати час) much time.

Jane: Oh, it takes me now not more than an hour to read a novel.

M.: Really?

J.: Two months ago it would have taken me about two days. It is a pity you didn't join me when I was taking speed-reading course.

M.: Two things hold me back. Doubts that any system could radically and permanently increase my speed. And money for the courses.

J.: But I thought that if I could double my speed, the sum wouldn't be so much.

M.: Sure, you are right. By the way, some authorities say it isn't reading. Though a lot of unread newspapers, books and magazines about the house might fall on me. My present work day reading is 200 words per minute, it is very slow. How are those speed reading courses?

J.: Great, today 50,000 students a year take these courses.

M.: How long does this course last?

J.: Eight weeks, a 2,5 hour session a week plus an hour a day drill.

M.: What is your speed now?

J.: The final test showed that my speed was 1520 w.p.m. The book was the same we have used for our entrance exam.

M.: But you can lose the technique.

J.: It is another question. The only wide survey (опитування) of ex-students — 1800 of them — showed that after a year one third of the people weren't using the method at all. Another third said they use it sometimes and that probably they have kept speed. But the rest of the students said they were reading faster than a year later.

Text 8B

Optical Technology

One of the most interesting developments in telecommunication is the rapid progress of optical communication where optical fibers are replacing conventional telephone wires and cables. Just as digital technologies greatly improved the telephone system, optical communication promises a considerable increase in capacity, quality, performance and reliability of the global telecommunication network. New technologies such as optical fibers will increase the speed of telecommunication and provide new, specialized in-information service. Voice, computer data, even video images, will be increasingly integrated into a single digital communication network capable of processing and transmitting virtually any kind of information.

It is a result of combining two technologies: the laser, first demonstrated in 1960, and the fabrication 10 years later of ultra-thin silicon fibres which can serve as lightwave conductors. With the further development of very efficient lasers plus continually improved techniques to produce thin silica fibres of incredible transparency, optical systems can transmit pulses of light as far as 135 kilometers without the need for amplification or regeneration.

At present high-capacity optical transmission systems are being installed between many major US cities at a rapid rate. The system most widely used now operates at 147 megabits (thousand bits) per second and accommodates 6,000 circuits over a single pair of glass fibres (one for each direction of transmission).

This system will soon be improved to operate at 1.7 gigabits (thousand million bits) per second and handle 24,000 telephone channels simultaneously.

A revolution in information storage is underway with optical disk technology.

The first digital optical disks were produced in 1982 as compact disks for music. They were further developed as a storage medium for computers. The disks are made of plastics coated with aluminium. The information is recorded by using a powerful laser to imprint bubbles on the surface of the disk. A less powerful laser reads back the pictures, sound or information. An optical disk is almost indestructible and can store about 1000 times more information than a plastic disk of the same size.

One CD-ROM disk (650 MB) can replace 300,000 pages of text (about 500 floppies), which represents a lot of savings in databases.

The future of optical storage is called DVD (digital versatile disk). A DVD-ROM can hold up to 17 GB, about 25 times an ordinary CD-ROM. For this reason, it can store a large amount of multimedia software and complete full-screen Hollywood movies in different languages. However, DVD-ROMs are «read-only» devices. To avoid this limitation, companies also produce DVD rewritable drives.

Besides, it is reported that an optical equivalent of a transistor has been produced and intensive research on optical electronic computers is underway at a number of US companies as well as in countries around the world.

It is found that optical technology is cost-effective and versatile. It finds new applications every day — from connecting communication equipment or computers within the same building or room to long-distance transcontinental, transoceanic and space communications.

Text 8C

Прочитайте текст і розкажіть про практичне застосування лазерів.

An Encyclopedia on a Tiny Crystal

Scientists have discovered that a laser beam can be effectively used to record alphanumeric data and sound on crystals. According to Russian researchers a method for recording information on crystals by means of a laser has already been developed, but advanced technologies are needed to make it commercially applicable.

At present researchers are looking for the most suitable chemical compounds to be used as data storages and trying to determine optimum recording conditions. Theoretically, the entire «Great Soviet Encyclopedia» can be recorded on a single tiny crystal.

As far back as 1845, Michael Faradey discovered that a light beam reverses its polarization as it passes through a magnetized crystal. Scientists of our day have used this phenomenon to identify crystalline materials capable of storing information. Lasers have been successfully employed to record information on and read it off.

No ideal data storage crystal has yet been found, but it is obvious now that the future of computer engineering lies in lasers and optoelectronics.

LESSON 9

Складний підмет і складний додаток
Text 9A. *Superconductivity*
Text 9B.
Text 9C. *New Hope for Energy*

Вправа 1. Перекладіть речення із складним додатком.

1. We know Morse to have been a painter by profession. 2. Scientists expect lasers to solve the problem of controlled thermonuclear reaction. 3. M. Faraday supposed a beam of light to reverse its polarization as it passed through a magnetized crystal. 4. Designers expect dirigibles to be used for exploration of new territories. 5. Japanese designers believe a new ceramic engine to replace the conventional one. 6 Engineers suppose a new «night vision» system to enable drivers to see better after dark. 7. Scientists believe new laser devices to be widely used in medicine. 8. We know the first digital optical disks to have been produced as disks for music. 9. They believed him to be capable.

Вправа 2. Знайдіть інфінітив в реченнях, перекладіть.

A. 1. Hundreds of radio navigation stations watch the airplanes find their destination and land safely. 2. Twice a year people see birds fly south and north, but we don't know how they find their way. 3. At the Paris Exhibition people watched the cargo airplane «Ruslan» carry a great amount of cargo. 4. When you stand near a working engine you feel it vibrate. 5. Making experiments with electric telegraph Morse noticed a pencil make a wavy line when connected to an electric wire. 6. Nowadays people watch on television cosmonauts work in space, «Lunokhod» move on the surface of the Moon and Olympic games take place on the other side of the globe.

B. 1. A force applied to a body causes it to move in a straight line. 2. The unsatisfactory results of Bell's experiments forced him to change the method of testing. 3. The excellent properties of Damascus steel made metallurgists of the whole world look for the lost secret of the steel. 4. Very high temperatures often cause certain materials to break. 5. Bad weather conditions make pilots switch over to automatic control.

Вправа 3. Зверніть увагу на інфінітивний зворот, що складається з прийменника *for,* додатка та інфінітива.

1. It was the only thing for us to do. 2. The students were waiting for the lecturer to describe the properties of a new composite material. 3. It is for you to

decide which of the two methods to use. 4. It is necessary for the students to know the properties of various alloys. 5. A system of satellites is provided for people to watch the central TV program.

Вправа 4. Перекладіть речення зі складним підметом.

A. 1. Students of Cambridge are supposed to wear gowns at lectures. 2. The first pocket-size colour television sets were reported to have been developed. 3. Today's aircraft is expected to be replaced by a new model of hypersonic aircraft in a few years. 4. Intensive research on optical-electronic computer is said to be going on in a number of US companies. 5. A method for recording information on crystal by means of a laser is known to have been developed by a Russian researcher. 6. The annual output of personal computers is expected to reach millions in the near future. 7. The laser is known to be a device producing an intensive beam of light by amplifying radiation. 8, Optical technology has been found to be cost-effective. 9. The optical equivalent of a transistor is reported to have been produced.

B. 1. Our present-day life seems to be quite impossible without telephone, radio, and television. 2. Nowadays the principle of radio operation seems to be quite simple. 3. The term «radar» is known to be composed of the first letters of «radio, detection and ranging». It happens to reflect its basic principle, that is, the location of an object at a distance. 4. About 50 per cent of Lake Baikal water proved to have been polluted since the Baikal plant has begun its work. 5. Lasers appeared to be highly useful for solving the problem of controlled thermonuclear reaction and communication. 6. A system of Earth satellites appears to have solved the problem of transmitting the central TV program to any part of the world. 7. Electricity proved to be able to travel instantly over a long piece of wire.

C. 1. Dirigibles are likely to be used for taking tourists to distant and beautiful places. 2. Lasers are unlikely to be used in our everyday life soon. 3. Superconductivity is certain to bring about new discoveries in science and technology.

Вправа 5. Перекладіть, звертаючи увагу на різні значення слів *more* і *much.*

1. One more present-day complicated problem to be solved is that of combining laser and thermonuclear reaction to produce a practically limitless source of energy. 2. A Japanese company is planning to install several more electronic devices on the car instrument panel. 3. The Voice Warning System is one more electronic device. 4. If you make half-hour breaks while getting ready for your exams, your brain will work much more efficiently. 5. Aerodynamics is one more problem to be taken into consideration when designing a hypersonic

craft. 6. The wheel-computerized system is much more efficient than those used previously. 7. Cryogenic fuels used both as coolant and propellant make the solution of the superliner surface cooling problem much easier to solve. 8. The fact that dirigibles are much larger in size and their staying power is much longer than those of an aircraft makes them ideally suited for exploration.

Вправа 6. Знайдіть українські еквіваленти для словосполучень.

the physics discoveries, discoveries that led to, the scientific advantage, advantage could well come to nation, to bring the mankind to, mercury wire, unexpected phenomenon, to return to normal state, by passing electric current, by applying magnetic field, to make a great contribution, they introduced a model, a model proved to be useful, a theory won for them the Nobel Prize, research in superconductivity, research became especially active, the achieved record of 23 K.

дослідження особливо активізувалося; дослідження в галузі надпровідності; теорія, за яку вони отримали Нобелівську премію; привести людство до ...; перевага в науці; відкриття в галузі фізики; досягнутий рекордний рівень в 23 К; відкриття, що привели до ...; перевагу могла б отримати нація (країна); дріт з ртуті; повернутися в звичайний стан; пропускаючи електричний струм; зробити великий внесок; несподіване явище; вони запровадили модель; прикладаючи магнітне поле; модель виявилась ефективною.

Вправа 7. Прочитайте і перекладіть інтернаціональні слова.

prestige [pres'tJZ], nation ['neISqn], Nobel prize [nqu'bel praIz], absolute zero ['xbsqlHt 'zIqrqu], phenomenon [fI'nOmInqn], normal, magnetic, electromagnetic, theory ['TIqrI], theorists ['TIqrIsts], fundamental theory, physics, physicist, model ['mOdl], metallic [mI'txlIk], ceramic [sI'rxmIk], colleagues ['kOlJgz], laboratory, critical temperature, fabricate, extremely [Iks'trJmlI], process ['prquses].

Вправа 8. Прочитайте і запам’ятайте вимову слів:

latest ['leItIst], spectacular [spek'txkjulq], breakthrough ['breIk'TrH], compare [kqm'pFq], award [q'wLd], research [rI'sWC], mercury ['mWkjurI], wire ['waIq], below [bIlqu], 5°C ['faIv di'grJz 'sentIgreId], completely [kqm'plJtlI], return [rI'tWn], either ['aIDq], finally ['faInqlI], Zurich ['zjuqrIk], previously ['prJvjqslI], throughout [TrH'aut], liquid ['lIkwId], nitrogen ['naItqGqn], lose [lHz], moreover [mL'rquvq], lack [lxk].

СЛОВА ТА СЛОВОСПОЛУЧЕННЯ ДЛЯ ЗАПАМ'ЯТОВУВАННЯ

achievement *n* — досягнення
below *adv* — нижче, внизу
benefit *n* — вигода, користь
boil *v* — кипіти
continue v — продовжувати
cool *v* — охолоджувати
current *n* — електричний струм
discover *v* — відкривати, виявляти
introduce *v* — вводити
lack *v* — потребувати
likely *adv* — очевидно
lose *v* — губити
master *v* — оволодівати
moreover *adv* — більш того
pass *v* — пропускати
at once — одразу, негайно
present *v* — представляти
previously *adv* — раніше, перше
prominent *a* — видатний, відомий
random *a* — випадковий, безладний
resistivity *n*— питомий опір
return *v* — повертатися
satisfactory *a* — задовільний, прийнятний
suddenly *adv* —раптом, зненацька
sufficiently *adv* — достатньо
tend *v* — прагнути, мати тенденцію
wire *n* — провід

Text 9A

Superconductivity

According to the prominent scientist in this country V.L. Ginz-burg the latest world achievements in the field of superconductivity mean a revolution in technology and industry. Recent spectacular breakthroughs[1] in superconductors may be compared with the physics discoveries that led to electronics and nuclear power. They are likely to bring the mankind to the threshold of a new technological age. Prestige, economic and military benefits could well come to the nation that first will master this new field of physics. Superconductors were once thought to be physically impossible. But in 1911 superconductivity was discovered by a Dutch physicist K. Onnes, who was awarded the Nobel Prize in 1913 for his low-temperature research. He found the electrical resistivity of a mercury wire to disappear suddenly when cooled below a temperature of 4 Kelvin (-269 °C). Absolute zero is known to be 0 K. This discovery was a completely unexpected phenomenon. He also discovered that a superconducting material can be returned to the normal state either by passing a sufficiently large current through it or by applying a sufficiently strong magnetic field to it. But at that time there was no theory to explain this.

For almost 50 years after K. Onnes' discovery theorists were unable to develop a fundamental theory of superconductivity. In 1950 physicists Landau and Ginzburg made a great contribution to the development of superconductivity theory. They introduced a model which proved to be useful in understanding electromagnetic properties of superconductors. Finally, in 1957 a satisfactory

theory was presented by American physicists, which won for them in 1972 the Nobel Prize in physics. Research in superconductors became especially active since a discovery made in 1986 by IBM[2] scientists in Zurich. They found a metallic ceramic compound to become a superconductor at a temperature well above[3] the previously achieved record of 23 K.

It was difficult to believe it. However, in 1987 American physicist Paul Chu informed about a much more sensational discovery: he and his colleagues produced superconductivity at an unbelievable before temperature 98 K in a special ceramic material. At once in all leading laboratories throughout the world superconductors of critical temperature 100 K and higher (that is, above the boiling temperature of liquid nitrogen) were obtained. Thus, potential technical uses of high temperature superconductivity seemed to be possible and practical. Scientists have found a ceramic material that works at room temperature. But getting superconductors from the laboratory into production will be no easy task. While the new superconductors are easily made, their quality is often uneven. Some tend to break when produced, others lose their superconductivity within minutes or hours. All are extremely difficult to fabricate into wires. Moreover, scientists lack a full understanding of how ceramics become superconductors. This fact makes developing new substances largely a random process. This is likely to continue until theorists give a fuller explanation of how superconductivity is produced in new materials.

Notes to the Text

1. spectacular breakthroughs — захоплюючі відкриття, досягнення
2. IBM — компания Ай Бі Ем
3. well above — набагато вище

ВПРАВИ

Вправа 9. Прогляньте текст 9А та дайте відповіді на питання.

1. What is this text about? 2. What is the phenomenon of superconductivity? 3. Who was the first to discover the phenomenon? 4. What scientists do you know who have worked in the field of superconductivity? 5. What materials are the best superconductors? 6. Is it possible to return superconducting materials to the normal state? 7. How can it be done? 8. In what fields of science and technology can the phenomenon of superconductivity be used?

Вправа 10. Вкажіть, які твердження відповідають змісту тексту 9А. Виправте неправильні твердження.

1. The latest achievements in superconductivity mean a revolution[4] in technology and industry. 2. Superconductors were once thought to be physically impossible. 3. The achievements in superconductivity cannot be compared with the discoveries that led to electronics and nuclear power. 4. The electrical resistivity of a mercury wire disappears when cooled below 4 K. 5. A superconducting material cannot be returned to the normal state. 6. Landau and Ginzburg introduced a model which was useful in understanding electromagnetic properties of superconductors. 7. Scientists from IBM found a ceramic material that became a superconductor at a temperature of 23 K. 8. Potential technical uses of high temperature superconductivity are unlikely to be possible and practical.

Вправа 11. Знайдіть в тексті 9А інфінітивні конструкції.

Вправа 12. Порівняйте пари речень, перекладіть.

1. Designers report a new manned craft to be able to submerge to the depth of 21,000 feet. A new manned craft is reported to be able to submerge to the depth of 21,000 feet. 2. We know radio navigation stations to be located at different places around the world to guide the pilots. Radio navigation stations are known to be located all over the world to guide the pilots. 3. People considered dirigibles to be too slow and unreliable, that is why they were not used for a long time. Dirigibles were considered to be slow and unreliable. 4. Experts expect the new submersible craft to move round the ocean floor like a sports car. The new submersible craft is expected to move round the ocean floor like a sports car. 5. Scientists in many countries consider propeller engines to be much more economical. Propeller engines are considered to be much more economical. 6. We know propeller planes to fly slower than jet planes, therefore, a new ventilator engine with a propeller has been built. But as propeller planes are known to fly slower than jet planes a new ventila- tor engine with a propeller has been built.

Вправа 13. Знайдіть речення із складним підметом, перекладіть.

1. The phenomenon of superconductivity appears to have been discovered as early as 1911. 2. Before 1911 superconductivity was assumed to be impossible. 3. Recent discoveries in superconductivity made scientists look for new conducting materials and for practical applications of the phenomenon. 4. The latest achievements in the field of superconductivity are certain to make a revolution in technology and industry. 5. Recommendations from physicists will

allow the necessary measures to be taken to protect the air from pollution. 6. Lasers are sure to do some jobs better and at much lower cost than other devices. 7. M. Faraday supposed a light beam to reverse its polarisation as it passed through a magnetised crystal. 8. Superconductors are likely to find applications we don't even think of at present. 9. A Dutch physicist found a superconducting material to return to normal state when a strong magnetic field was applied. 10. Properties of materials obtained in space prove to be much better than those produced on Earth. 11. There are prospects for lasers to be used in long distance communication and for transmission of energy to space stations. 12. The electrical resistivity of a mercury wire was found to disappear when cooled to —269 °C. 13. Additional radio transmitters let the pilot make his approach to an airport by watching his flight instruments. 14. There seems to be a lot of alloys and compounds that become superconductors under certain conditions.

ВПРАВИ ДЛЯ САМОСТІЙНОЇ РОБОТИ

Вправа 14. Визначте, до якої частини мови відносяться слова.

resistant, resist, resistance, resistor, resistivity; superconductivity, superconductive, superconductor, superconducting; theory, theorist, theoretical, theorize; physics, physicist, physical, physically; explain, explainable, explanation; store, storage, storable.

Вправа 15. Знайдіть українському слову відповідне англійське.

досягнення — achievable, achievement, achieve; електронний — electronics, electronic, electron; легше — easily, easy, easier; задовольняти — satisfy, satisfactory, satisfaction; дійсно — reality, realise, really.

Вправа 16. Знайдіть синоніми и антоніми.

below — above; useful — useless; easy — difficult; field — sphere; to meet demands — to meet requirements (needs); full — complete; to use — to apply; to get — to obtain; moreover — besides; sufficient — enough; likely — unlikely; to continue — to discontinue; conductivity — nonconductivity; to vary — to change; to lead to — to result in; recent — latest; advantage — disadvantage; low — high; believable — unbelievable; to lose — to find; tiny— huge; liquid — solid; unexpected — expected; common — ordinary.

Вправа 17. Прочитайте та перекладіть текст без словника.

The ancient Greeks are known to have been great watchers of the sky and also great thinkers. As they watched the sky night after night, it was natural for them to think that the Earth stood and the stars, planets, sun and moon were moving round the earth in space. They thought the sun to be between Venus and Mars. To explain the movement of the planets, however, was very difficult. Then one day a young scientist named Copernicus at Krakow University in Poland supposed that the sun and not the Earth should be the centre of everything. He was the first to explain properly our solar system. The ancient Greeks had made the mistake of thinking that because the stars and planets seemed to move as they looked at the sky, the Earth must stand. If you sat in a train and looked out at the trees, it would be easy to understand their mistake. The trees seem to be moving backwards, but really it is the train that is moving forwards.

CONVERSATION

Exercise 1. Answer the questions.

1. What field of science studies the phenomenon of superconductivity? (physics) 2. What can a nation have if it is the first to master this new field of science? (prestige, scientific advantage, economic and military benefits) 3. What is superconductivity? (the loss of electrical resistivity by a material on being cooled to temperatures near absolute zero) 4. What is absolute zero? (0 Kelvin or —273 °C) 5. What scientists worked in the field of superconductivity research? (Dutch physicist K. Onnes, Russian physicists L. Landau and V. Ginzburg, and a number of American scientists) 6. What materials are the best super conductors? (ceramic materials) 7. What are the potential technical uses of superconductivity? (nuclear research, power generation, electronics, etc.)

Exercise 2. Make a sentence out of the two parts.

1. Recent achievements in super-conductivity research are	1. fundamental theory to explain this unexpected phenomenon.
2. They may be compared with	2. found the electrical resistivity of mercury to disappear when cooled to the temperature of 4 Kelvin.
3. Superconductivity is known to	3. to the development of super-conductivity theory.
4. While carrying out his low temperature research he	4. have been discovered by a Dutch physicist.

5. For 50 years after the discovery there was no	5. of great importance for science and technology.
6. In the 1950s Russian and American physicists made a great contribution	6. since the discovery of a super-conductive metallic ceramics.
7. Research in the field of super-conductivity became especially active	7. physics discoveries that led to the development of electronics and nuclear power.

Exercise 3. Read and learn.

Professor Brown: Hello, glad to meet you, prof. Smith, haven't seen you for ages, since I left the University.

Prof. Smith: How do you do, prof. Brown, I haven't expected to see you here. Are you interested in superconductivity problems? By the way, how are you making your living? I haven't heard anything about your work lately. I spent the last two years in Geneva as a member of a special UN committee.

Pr. B.: I am with Bell Telephone company. It is a global leader in electrical engineering. And I deal with new technologies.

Pr. S.: Oh, your work is so important nowadays. Mankind needs energy for producing light, heat and transportation. This is the basis of our civilization.

Pr. B.: Sure, that's so. And as the population grows, so does the demand for better quality of life. Energy consumption increases daily.

Pr. S.: But with it the threat to clean air, pure water and soil increases too. These natural resources are not inexhaustible.

Pr. B.: Of course. We are developing new industrial systems to improve productivity, reducing the amount of raw materials and energy required. Our new advanced systems help to conserve energy too.

Pr. S.: In Geneva one of the problems I studied was the problem to generate, transmit and distribute energy with great efficiency. I think Doctor Carter's work in this field is the most promising. From the Agenda (порядок денний) we have all just received you can see that Dr. Carter will speak on his work tomorrow.

Pr.B.: I have already seen this paper on the program. I won't miss (пропустити) it. Have you attended the morning session?

Pr. S.: The most interesting was the discussion on the problems of the balance between the needs of mankind and the conservation of the natural resources.
Pr. B.: Have you taken part in it?
Pr. S.: Certainly. I've spoken about clean and efficient technology in the field of electrical engineering.

Text 9B

Прочитайте текст і дайте йому заголовок.

Superconductivity is a state of matter that chemical elements, compounds and alloys assume on being cooled to temperatures near to absolute zero. Hence, a superconductor is a solid material that abruptly loses all resistance to the flow of electric current when cooled below a characteristic temperature. This temperature differs for different materials but generally is within the absolute zero (-273 °C). Superconductors have thermal, electric and magnetic properties that differ from their properties at higher temperatures and from properties of nonsuperconductive materials.

Now hundreds of materials are known to become superconductors at low temperature. Approximately 26 of the chemical elements are superconductors. Among these are commonly known metals such as aluminium, tin, lead and mercury and several less common ones.

Most of the known superconductors are alloys or compounds.

It is possible for a compound to be superconducting even if the chemical elements constituting it are not.

Тех 9C

Прочитайте текст і знайдіть інформацію про застосування надпровідників у майбутньому. Викладіть короткий зміст тексту англійською мовою.

New Hope for Energy

Recently some ceramic materials have been found to be superconductors. Superconducting ceramics are substances which can transmit electric currents with no loss of energy at temperatures much higher than conventional superconductors (that is, at the temperature of liquid nitrogen).

One use for the new superconductors would be to replace those that need the extreme cold of liquid helium — huge superconducting electromagnets used

in nuclear magnetic resonance research, atomic particle acceleration and research reactors.

Other types of electromagnets made with superconductors could be used to lower the cost of electric generation and storage. Such uses may take 10 years of research, a quicker use will probably be in electronics.

Researchers now estimate that tiny but immensely powerful highspeed computers using superconductors may be three to five years away. Further off are 300 m.p.h. trains that float on magnetic cushions which now exist as prototypes but may take at least a decade to perfect. Power lines that can meet a city's electric needs with superconductor cables may be even further in the future.

Meanwhile, scientists around the world are trying to turn the new materials into useful products. Among the most notable is a micron-thin film to transmit useful amounts of electric current without losing superconductivity. The film could be used in the microscopic circuitry of advanced computers as high-speed pathway (маршрут, соединение) between computer chips.

Several nations are known to be very active in superconductor research. For example, the United States is spending millions of dollars on such research, much of it for military uses: projectile accelerators, lasers, ship and submarine propulsion.

ДОДАТКОВІ ТЕКСТИ

Text

The world of microelectronics

Switching on a portable radio transistor, a low-wave TV-set, looking at an electronic watch or counting on a micro-calculator, we hardly give thought to the idea of how these devices work — so common are they in our lives. What has brought them into being? How do miniature apparata perform complicated operations in general? These miniature devices, one of the greatest achievements of scientific and technological progress, are functioning on the basis of microelectronic circuits. Microelectronics, a section of semiconductor electronics, is developing at a rapid pace. It defines the technical and elemental base of cybernetics, instrument engineering as well as the efficiency of research and thus influences the scientific and technological potential of the country.

A great role belongs to microelectronics in our national economy. Its appearance and intensive development was caused by the necessity of using a great quantity of active elements: diodes, transistors, variable capacitors.

Semiconductor elements are usually presented in a microminiaturized form: they are arranged in a single crystal, though their quantity sometimes exceeds hundreds of thousands. But this is a unique apparatus, a very complicated circuit which performs quite a number of processes. Such devices have acquired the name of integrated circuits. The "cleverest" of them perform the function of "logical thinking" and carry out rather a complicated operation of processing information. They have been called microprocessors.

At the base of modern microelectronic devices lie semiconductor elements. Microelectronics itself is based on planar technology and photolithography. Integral circuit is a complicated structure with its ways, sluices and quick-working gates for the flows of electrons which are carriers of information. They are able to act at command just as to work independently. And that means that the electrons can create a new process, direct operations, think over and carry out such complicated calculations that are inaccessible even to a great number of qualified specialists.

The history of microelectronics is not so long: 1947 saw the creation of the first semiconductor transistor on which applied semiconductor electronics is based. Ten years later, in 1958, the first integrated circuit appeared. Industrial production of integrated circuits began in 1960s. First they consisted of several elements, later the count went by the hundred, at present supergreat integrated circuits count several hundreds of thousands of elements in one crystal.

No branch in the history of technique has ever lived througli such a rapid growth. The level of the development of microelectronics defines the level of all

computers and data processing as well as diverse complicated systems of electronic automation.

There is a great social demand for creating automata of wide application (up . to robot including), for constructing new computers and complexes facilitating the work of people.

Дайте відповіді на запитання.

1. What are the most popular electronic devices? 2. What are the electronic miniature devices functioning on? 3. What science defines the technical and elemental base of cybernetics and instrument engineering? 4. What caused the appearance of microelectronics? 5. What devices acquired the name of integrated circuits? 6. What is at the base of modern microelectronics? 7. When does the history of microelectronics begin? 8 When did the first integrated circuit appear? 9. What do we call modern supergreat integrated circuit? 10. Why is the development of microelectronics so important for any national economy?

Text

Radio engineering and television

The seventh of May is traditionally named Radio Day. It was on this day in 1895 that A- S. Popov, a Russian scientist, reported in the Physics Department of the Russian Physical and Chemical Society on his invention of a sensitive re ceiver which detected and registered electric oscillations In the atmosphere. He demonstrated his radio-receiving set in operation. Popov's invention found practical application in meteorology and communication. Since then, radio communication and radio engineering have made a tremendous progress. A great number of scientists and inventors contributed to this progress. Radio has become such a part of our life that we cannot imagine our existence without it. Now it is hardly possible to name a sphere of science, engineering or national economy where radio equipment is not used.

Today radio engineering is a very vast field, which includes a great number of specialized branches, such as radio communication, television, radiolocation (radar), radioastron-omy, radiotelemetry, automatics, cybernetics, and so on.

The invention of the radio (electronic) valve made possible the transmission of speech, music and vision signals and thus led to broadcasting and television. While radar helps navigation at sea and makes air navigation and flight safe, television helps man to see what goes on hundreds and thousands of kilometres away. Man is already able to cast his electric eye at the bottom of the sea, inside a roaring blast furnace and a live nuclear reactor. Without radio, radiobeacon

and radiocompass it would be not safe to travel by air and by sea in foggy and stormy weather. Without radioelectronic equipment space flight would be impossible. Radiolocators installed on sputniks help see from outer space the formation of typhoons or hurricanes, calculate their force and direction, determine spring floods of rivers, etc.

Radio and television are not only the reliable means of communication but also efficient means of educating people, spreading knowledge and ideas and raising the cultural level of the population. Television finds ever wider application in various fields of national economy.

In radioastronomy radiotelescopes are used to investigate the Universe, to obtain data on chemical composition and surface conditions of the Sun and other planets.

Radio engineering technique is widely used in radiotelemetry to indicate or record a measurable quantity at a distance.

At present we produce equipment for powerful broadcasting and television centres and radio-relay stations, electronic computers, radar stations, telecontrol and telemetric systems, etc.

Radiobroadcasting is the technique of use of radio (electromagnetic) waves for wireless transmitting of sound. Radiowaves are produced at the broadcasting station and radiated by the aerial. Radiowaves generated by the radio transmitter and emitted by the aerial propagate in all directions. Radioreceivers receive, transform and amplify the energy of radiowaves into audio signals so that they can reach the loudspeaker, headphones, a relay, recording equipment, etc. Radioreceiver is one of the main elements of broadcasting, communication systems, television, radar and many other fields of engineering. The lower the power of signals received, the higher sensitivity of the receiver should be.

Broadcasting based on digital coding has revealed many advantages over conventional broadcasting. It consists in converting soundwaves into series of digits and their subsequent transmission in the form of monofrequential pulses. A signal is then received and after amplification is sent to the acoustic system for reproduction. Digital coding enhances the quality of broadcasting, makes it possible to reduce considerably the size of new receiver-decoders. In digital broadcasting more than one station can use one and the same wavelength without interference.

Many fundamentally new radioengineering devices have appeared of late, which infinitely extend the range of their application.

Notes to the Text

1. radio communication — радіозв'язок
2. to cast one's eye (at) — кинути погляд, глянути (на)
3. blast furnace — доменна піч, домна
4. live [laiv] nuclear reactor — діючий атомний реактор

5. measurable quantity — величина, яку можна виміряти
6. technique of use (of) — метод використання (чого-н.)
7. conventional (broadcasting) — звичайне, традиційне (радіомовлення)
8. monofrequent(ial) pulse — одночастотний імпульс
9. digit(al) coding — цифрове кодування
10. series of digits — ряди цифр (сигналів)
11. receiver-decoder — приймально-декодувальний пристрій

Дайте відповіді на наведені нижче запитання:

1. When is Radio Day marked? 2. Who is the inventor of radio? 3. Why is Radio Day marked on the 7th of May? 4. Where did Popov's invention find application? 5. Where is radio equipment used now? 6. Where is television applied today? 7. What modern radioengineering techniques do you know? 8. Where are radio-waves produced and how are they radiated? 9. How does radio work? 10. What is digital broadcasting? 11. What does digital broadcasting eonsist in? 12. What advantages has digital broadcasting revealed over conventional broadcasting?

Text

Прочитайте та перекладіть

Television

Television provides a means of viewing the images of objects that are out of sight, i. e. far removed from the observer.

The images of moving or stationary objects are converted into electric signals and these signals are transmitted by a television transmitter. The television receiver (TV-set) picks up these signals and performs the reverse conversion of electrical signals into the image displayed on the screen of a cathode ray tube (CRT). Television signals can be transmitted by means of transmission lines as well as by radio.

The transmission of video signals is more complicated than the transmission of audio signals by means of radio-waves. There is a difference between the perception of audio signals and video signals by the human being. No matter how complex the audio signal is, the human ear interprets it as the sum total of all its components, i, e. as a single sound. The human eye, on the other hand, can perceive many different objects at one and the same time. Modern television techniques have taken all the peculiarities of human sight into consideration.

The iconoscope camera tube was developed as far back as the early thirties. Later, other types of camera tubes came into use, such as the supericonoscope which is more commonly known as the image iconoscope. The tube in the

television receiver, that provides picture display, is called the picture tube or kinescope.

The image of an object is projected onto the camera tube. The electron beam of this tube scans the image point by point. The beam scanning is controlled by a scan unit. At the tube output, pulses corresponding to the image are generated. These signals are usually termed the picture signals.

These pulses are amplified and used to drive the television transmitter, where they modulate the transmitter carrier. Transmission is usually achieved by amplitude-modulation techniques. The resulting radio-frequency vision signals are transmitted by the aerial and picked up by the receiving aerial, in which they induce an e. m. f. corresponding in frequency and waveform to the transmitted signals. Received signals are fed to the video channel amplifier, that is essentially a pulse receiver. Here the signals are amplified and detected; the picture signals from the detector output are amplified and used to drive the television tube brightness control electrode.

The movement of the electron beam in the television tube must be strictly synchronous and in phase with the electron beam of the camera tube. This phasing is accomplished by transmitting special syncpulses, provided by a synchronization generator (timer). These syncpulses control the scan of the camera tube and are transmitted along with the picture signals. At the receiver, these syncpulses are extracted from the composite video signal and used to control the operation of the scan.

In television broadcasting, the sound signal is transmitted simultaneously with the video signal. The audio signal from a microphone is amplified and used to modulate the frequency sound channel carrier. Both transmitters feed one common aerial through a special coupling filter. The receiver aerial picks up the sound and vision radio frequency signals. After amplification, the sound signal is separated from the composite signal, amplified, and used to drive a loudspeaker.

Слова та словосполучення для розуміння тексту:

out of sight — поза межами видимості, reverse conversion — обернене перетворення, cathode ray tube (CRT) — електронно-променева трубка, sum total — сукупність, to perceive — відчувати, сприймати, perception — сприйняття, відчуття, (iconoscope) camera tube — передавальна телевізійна трубка, image iconoscope — іконоскоп з перенесенням зображення, суперіконоскоп, scan unit — сканувальний прилад, television transmitter — телевізійний передавач, transmitter carrier — несуча (частота), sound channel carrier — несуча (частота) звукового каналу, amplitude modulation techniques — прилади амплітудної модуляції, radio-frequency vision signals — відеосигнал високої частоти, electromagnetic field (e. m. f.) — електромагнітне поле, to feed — подавати, video channel amplifier —

підсилювач відеоканалу, pulse receiver — приймач, підсилювач імпульсу, detector output — вихід детектора, television tube brightness control electrode — електрод управління чіткістю телетрубки, to scan — розгортати зображення, output — вихід, frequency-modulated signal — частотно-модульований сигнал, syncpulses — синхроімпульси, coupling filter — фільтр зв'язку, to drive — приводити в рух.

Дайте відповіді на запитання:

1. What kind of means of viewing object images does television provide? 2. What does the television receiver do? 3. By what means can television signals be transmitted? 4. What is the difference between the audio signals and video signals? 5. How many different objects can the human eye perceive at one and the same time? 6. What does the electron beam of the tube do? 7. Where are signals amplified and detected?8. Why must the movement of the electron beam in the tube be strictly synchronous with the beam in the camera tube? 9.What is the role of syncpulses? 10. What does the receiver aerial pick up?

Складіть план тексту.

Text

Прочитайте та перекладіть

Automation and labour

It is a matter of common knowledge nowadays that the principal direction of the present-day scientific and technological progress consists in the revolution of mechanized forms of work through the automation of production. Quite recently, only some decades ago, even the words "automation", "automatic control" seldom appeared on the pages of the press or scientific publications. In the early forties the position radically changed. Soon automatic control was recognized throughout the world to be a new, progressive, independent branch of science and engineering. Today one cannot imagine technical progress without automation.

Automation may be defined as "the accomplishment of a job by an integrated mechanism with a minimum assistance of any kind". In fact, automation is the integration of four independent compounds which have been linked together into a single process. These integral parts of automation are: transfer machining, automatic assembly, communication engineering and control engineering.

Emphasis should be made that automation is not a mere extention of mechanization, but a qualitatively new step in technological development. It brought about radical changes in the technological nature of the relationship

between man and machine. In mechanization the function of the direct effect on the object of labour was transferred to the working mechanism. Here, man remained the principal agent of the technological process. He retained the functions of control, regulation, maintaining machines and direct intervention in production process. With the advent of automation these functions were transferred to the mechanical device. The automation of production enables man to operate machines with the help of other machines. Now machines discharge not only production but also intellectual, and in some cases even physiological functions.

Our country has many thousands of comprehensively mechanized and automated enterprises and workshops. The mechanized and automated production lines replace or lighten the work of a tremendous number of workers. All the hydro-power plants in the country have been completely automated. Annually hundreds of automated control systems go into operation at industrial, agricultural, communication, trade and transport enterprises and organizations.

Modern means of automation make it possible to link up in a single complex the whole technological chain: machine designing, equipment and rigging, control of a technological process, control of the whole enterprise. This has been made possible due to the extensive development and mass production of new types of computer technology, from large computers to microprocessors.

Needless to say, comprehensive automation calls for material inputs and time. But the economic effect from the release of "living labour", the intensification of production, the higher quality of output and more flexible technology make up for the inputs, while, on the social plane, it gives opportunities for creative work by both the makers of this technology and its users.

Thus, now the main trend in automation is developing not merely automatic machines, but entire technological processes and systems whose functioning excludes the direct involvement of men.

Such automated systems, called flexible manufacturing systems (FMS) are regarded by many experts as being the best way to meet the demands of industry. They consider the FMS to be the future of the automated factory, or at least the minimally manned factory.

The application of FMS requires advanced technical know-how.

Notes to the Text

1. matter of common knowledge — загальновідома справа
2. to consist in — полягати (в чому-н.)
3. emphasis should be made — необхідно наголосити (підкреслити)
4. with the advent of automation — з появою автоматизації
5. (machines) discharge functions — (машини) виконують функції
6. material input — матеріальний внесок (витрати)

7. release of "living labour[1]' — вивільнення робочої сили
8. advanced technical know-how — високий технічний досвід

Дайте відповіді на запитання:

1. What is the principal direction of the present-day scientific and technological progress? 2. Can one imagine technical progress today without automation? 3. What is automation? 4. Did the words "automation", "automatic control" appear recently or long ago? 5. What is the difference between mechanization and automation? 6. What are the integral parts of automation? 7. What does modern automation mean? 8. What is the basis of automation? 9. What is the economic effect of automation?

Text

Прочитайте та перекладіть

Automatic control in industry

Any technical development that enables a machine or instrument to dispense with labour is a step toward automation. Wherever two or more automatic machines are tied together with overriding automatic control to create a self-feeding, self-initiating and self-checking process, an automated system is created. The real distribution is between automation that displaces muscle and automation that displaces brain, and it is roughly the same distinction as that between automatic operation and automatic control. The industrial development of the nineteenth century was a change towards automatic operation. But mechanization was limited to individual processes, and only in a few trades it was possible to provide automatic links between processes and organized production as a continuous flow. In the twentieth century the idea was widely applied of producing goods in a continuous flow rather than in batches. The control was obtained by a human operator who noted faults and deviations and corrected them either directly or through instruments. Control may be simply mechanical, electrical, electronic or a combination.

The developments in automatic operation while extending their application, were not revolutionary but part of a well-established trend. Those in automatic control have been considerably more drastic, and arose largely from the recent and sudden application of electronic methods of control. Electro-mechanical, pneumatic and hydraulic devices also contributed, but the introduction of electronic computers marked the new stage in the development of automatic control. The electronic devices rapidly gained in importance and industrial enterprises widely used them to plan and control the operations of machines. These devices can detect faults in a processed part, communicate the error to the machine and adjust its operation so as to correct the fault. They can integrate the

work of industrial- machines and the more complex devices can select alternative courses of action according to the instructions fed into them, considerably extending the possibilities of remote control. Now electronic devices greatly reduced the amount of routine brainwork performed at factories. Rapid technological advance reduced the part played by human labour to skilled supervision and maintenance. Electronic computers have shown that man can rely on them for the performance of operations based on formal logic.

Automatic systems take several forms and are based on several different techniques, but in each case the measurement and correction of errors are performed and coordinated by electronic devices and the human operator does not take an active part in it.

First of all automatic control was widely established in such industries as chemicals, petroleum, iron and steel, cement, paper, textile, printing, food and others. The overall trend now is toward a total automatic control in industry with the help of new generations of electronic devices with their rapidity, accurateness, reliability, flexibility, and compactness.

The present day stage of automation is based on the revolution in computer technology, in computerisation of the whole national economy.

Додаток А

Таблиця найуживаніших нестандартних дієслів

I. Infinitive	II. Past Indefinite	III. Past Participle
arise виникати	arose	arisen
awake прокидатися	awoke	awoke/awaked
be бути	was (were)	been
bear носити	bore	born
become ставати	became	become
beat бити	beat	beaten
begin починати	began	begun
bend гнути	bent	bent
bind зв'язувати	bound	bound
blow дути	blew	blown
break розбити	broke	broken
bring принести	brought	brought
build будувати	built	built
burn горіти	burnt	burnt
buy купувати	bought	bought
catch ловити	caught	caught
choose вибирати	chose	chosen
come приходити	came	come
cut різати	cut	cut
deal мати справу з	dealt	dealt
do робити	did	done
draw креслити, тягнути	drew	drawn
drink пити	drank	drunk
drive приводити в дію	drove	driven
eat їсти	ate	eaten
fall падати	fell	fallen
feed годувати	fed	fed
feel почувати	felt	felt
fight боротися	fought	fought
find знаходити	found	found
fly літати	flew	flown
forget забувати	forgot	forgotten

I. Infinitive	II. Past Indefinite	III. Past Participle
freeze замерзати	froze	frozen
get отримувати	got	got
give давати	gave	given
go іти, ходити	went	gone
grind молоти	ground	ground
grow рости	grew	grown
hang висіти	hung	hung
have мати	had	had
hear чути	heard	heard
hide ховатись	hid	hidden
hit ударяти	hit	hit
hold тримати	held	held
keep зберігати	kept	kept
know знати	knew	known
lay класти	laid	laid
lead вести	led	led
learn вчити	learnt/learned	learnt/learned
leave залишати	left	left
lend позичати	lent	lent
let дозволяти	let	let
lie лежати	lay	lain
light запалювати	lit/lighted	lit/lighted
lose губити	lost	lost
make робити	made	made
mean означати	meant	meant
meet зустрічати	met	met
pay платити	paid	paid
put класти	put	put
read читати	read	read
ring дзвонити	rang	rung
rise підніматися	rose	risen
run бігти	ran	run
say говорити	said	said
see бачити	saw	seen
sell продавати	sold	sold
send посилати	sent	sent

I. Infinitive	II. Past Indefinite	III. Past Participle
shake трясти	shook	shaken
shine світити	shone	shone
shoot стріляти	shot	shot
show показувати	showed	shown
shut закривати	shut	shut
sing співати	sang	sung
sink занурюватися	sank	sunk
sit сидіти	sat	sat
sleep спати	slept	slept
slide ковзатися	slid	slid
speak розмовляти	spoke	spoken
spend проводити	spent	spent
split розщепляти	split	split
spread розповсюджувати	spread	spread
spring стрибати	sprang	sprung
stand стояти	stood	stood
steal красти	stole	stolen
stick приклеювати	stuck	stuck
strike вдаряти	struck	struck
swim плавати	swam	swum
swing коливати(ся)	swung	swung
take брати	took	taken
teach навчати	taught	taught
tear рвати	tore	torn
tell розповідати	told	told
think думати	thought	thought
throw кидати	threw	thrown
understand розуміти	understood	understood
wear носити	wore	worn
win вигравати	won	won
wind намотувати	wound	wound
write писати	wrote	written

Додаток Б

Англо-український словник

a **adjective - прикметник**
adv **adverb – прислівник**
cj **conjunction – сполучник**
n **noun – іменник**
pi **plural – множина**
pp **– дієприкметник**
pron **– займенник**
prp **preposition–прийменник**
v verb **– дієслово**

A

abandon v - *відмовлятися*
abbey *n* - *аббатство*
ability *n – здібність, здатність*
able *a* - *здібний*
about *adv – про, щодо*
above *prp – над, вище, понад*
abruptly *adv* - *раптом*
absence *n* - *відсутність*
absent *a* - *відсутній*
absolute *a* - *безумовний*
absorb v *– вбирати, поглинати*
academic *a – навчальний рік*
accelerate v - *прискорювати*
acceleration *n* - *прискорення*
accelerator *n* - *прискорювач*
accept v - *приймати*
access *n* - *доступ*
accessible *a* - *доступний*
accident *n – випадок, аварія*
accomodate v - *пристосовувати*
accomodation *n* - *пристосування*
accompany v - *супроводити*
accomplish v - *здійснювати*
accomplishment *n* - *закінчення*
accordance *n* - *згода*
according (to) – *відповідно до*
accordingly *adv* - *таким чином*
account *n* - *рахунок*
accounting *n – бухгалт. справа*
accumulate v - *акумулювати*
accuracy *n* - *точність*
accurate *a* - *точний*
achieve v - *досягти*
achievement *n* - *успіх*
acknowledge v - *визнавати*
acquire v - *набувати*
across *prp* - *упоперек*
act v - *діяти*
action *n – дія, вчинок*
active *a* - *активний*
activity *n* - *діяльність*
actual *a* - *фактичний*
actually *adv* - *насправді*
add v - *додавати*
addition *n* - *додавання*
adapt v - *пристосовувати*
address v - *направляти*
adequate *a* - *відповідний*
adjust v - *приладжувати*
admiral *n* - *адмірал*
adopt v - *приймати*
advance v - *просуватися*
advanced *a* - *прогресивний*
advantage *n* - *перевага*
advantageous *a* - *вигідний*
advice *n* - *порада*
advisable *a* - *доцільний*
advise v - *радити*
adviser *n* - *радник*
aerial *n* - *повітряний*
aeronautics *n* - *аеронавтика*
affect v *– діяти, впливати*
afloat *adv – на плаву*
after *prp, cj, adv – потім, після*
afterwards *adv – згодом, пізніше*
again *adv* - *знову*
against *prp* - *проти*
age *n* - *вік*
ago *adv – тому, давно*
agree v *– погоджуватися*
agreement *n – згода, договір*
ahead *adv* - *попереду*
aid v - *допомагати*
aim v - *прагнути*
air *n* - *повітря*
aircraft *n* - *літак*
airfield *n* - *аеродром*
alive *a* - *живий*
all *pron* - *усі, усе, увесь*
allow v - *дозволяти*
allowance *n – норма, поправка*
alloy *n* - *сплав*
almost *adv* - *майже*
alone *a – один, самотній*
along *prp* - *уздовж*

alphabet *n* - *алфавіт*
alphanumerical *a* - *алфавітний*
already *adv* - *вже*
also *adv* - *теж, також*
alternative *a* - *альтернативний*
although cj – *хоч, коли б*
altogether *adv – цілком, разом*
aluminium *n* - *алюміній*
a.m.(ante meridiem) *– ранковий час*
among *prp* - *між, серед*
amount v – *кількість, сума*
amplification *n* - *посилення*
amplifier *n* - *підсилювач*
amplify v - *збільшувати*
analyse v - *аналізувати*
analysis *n* - *аналіз*
ancestor *n – предок, походження*
ancient *a* - *стародавній*
angle *n – кут, підхід*
announce v - *оголошувати*
announcement *n* - *оголошення*
annually *adv – щороку*
another *a – інший, ще один*
antenna *(pi* **antennae)** *n* - *антена*
anticipate v - *передбачати*
anyway *adv – у всякому разі*
apart *adv – на віддалі*
apparatus *n – прилад, апарат*
apparently *adv* - *очевидно*
appear v – *з'являтися*
appearance n - *зовнішність*
appliance *n – прилад, пристрій*
applicable *a* - *придатний*
application *n – заява, вживання*
apply v – *вживати, застосовувати*
approach v – *підходити, наближатись*
approve v - *схвалювати*
approximate *a* - *приблизний*
arc *n – арка, дуга, склепіння*
architect *n* - *архітектор*
architecture *n* - *архітектура*
area *n – площа, простір*
arise (arose, arisen) v - *виникати*
arm *n* - *рука*
armoured *a* - *броньований*
army *n* - *армія*
around *adv – навколо, поблизу*
arrange v - *приводити до ладу*
arrangement *n – порядок, систематизація*
arrival *n – приїзд, прибуття*
arrive (at, in) v – *приходити до*
art *n* - *мистецтво*
article *n – пункт, стаття*
artificial *a* - *штучний*
artillery *n* - *артилерія*
artist *n* - *художник*
as *cj* - *як, наприклад*
ascend v - *підніматися*
ascent *n – підйом, круча*
ask v – *питати, запрошувати*
aspect *n – вигляд, аспект, точка зору*
assemble v - *збирати*
assembling *n* - *монтування*
assembly *n* - *монтаж*
assist v – *допомагати, сприяти*
assistance *n* - *допомога*
assistant *n* - *помічник*
associated *a – пов'язаний*
assume v - *припускати, вважати*
assumption *n* - *припущення*
astronomer *n* - *астроном*
astronomy *n* - *астрономія*
at *prp – у, в, на*
atmosphere *n* - *атмосфера*
atmospheric *a* - *атмосферний*
atom *n* - *атом*
atomic *a* - *атомний*
attach *v* - *приєднувати*
attachment *n* - *прикріплювання*
attain *v – досягати, набувати*
attempt *n – спроба, замах*
attend *v* - *відвідувати*
attention *n* - *увага*
attentive *a – уважний, чемний*
attentively *adv* - *уважно*
attitude *n – ставлення, постава*
attract *v – притягувати, приваблювати*
attractive *a* - *привабливий*
audible *a* - *чутний*
audience *n – аудиторія, глядачі*
author *n – автор, творець*
automatic *a* - *автоматичний*
automatically *adv* - *автоматично*
automation *n* - *автоматизація*
automatize *v* - *автоматизувати*
automobile *n* - *автомобіль*
availability *n* - *придатність*
available *a – придатний, наявний*
average *a* - *середній*
aviation *n* - *авіація*
avoid *v* - *уникати*
award *n* - *нагорода*
away (from) *adv – геть, далеко*

axis *n* **(pl axes)** - *вісь*
axle *n – вал, ведучий міст*

B

back *adv – позаду, назад*
backup *v* - *резервувати*
backward *adv* - *назад*
bag *n* - *сумка*
balance *n – вага, терези, баланс*
balloon *n – повітряна куля*
bank *n – вал, дамба, банк*
barrel *n – бочка, вал, барабан*
base *n – базис, основа*
basic *a* - *основний*
basis *n –підстава, основа*
battle *n – бій, битва*
beam *n* - *промінь*
bearing *n – насіння, відношення*
beat (beat, beaten) *v* - *бити*
beautiful *a – красивий, чудовий*
because *cj – тому що, бо*
become (became) *v* - *траплятися*
before *adv – до, раніше*
begin *v* - *починати*
to ~ with – *насамперед, по-перше*
beginning *n* - *початок*
beg pardon - *вибачатися*
body *n – тіло, тулуб*
boil *v – кипіти, варити*
boiler *n – паровий котел*
bomb *n* - *бомба*
bone *n* - *кістка*
booster *n* - *прискорювач*
border – *кордон, край*
boredom *n* - *смуток*
born - *народжений*
borrow *v* - *позичати*
both *pron* - *обидва*
bother *v – надокучати, дбати*
bottom *n – дно, основа*
brain *n – мозок, розум*
brake *n – гущавина, перерва*
branch *n – гілка, галузь*
break (broke, broken) - *ламати*
breakthrough *n – прорив, отвір*
bright *a* - *яскравий*
brightness *n* - *яскравість*
brilliant *a* - *блискучий*
bring (brought) *v* - *приносити*
brittle *a – ламкий, крихкий*
broad *a* - *широкий*
bubble *n* - *бульбашка*
build (built) *v* - *будувати*
built-in *pp* - *вбудований*
building *n* - *будівля*
bumper *n – бампер, удар*
bureau *n – бюро, управління*
burn (burnt, burned) *v – палити, горіти*
businessman *n – ділок, бізнесмен*
but *adv – крім, але, проте*
button *n – гудзик, кнопка*
buy (bought) *v* - *купувати*
buzzer *n – гудок, зумер*
by *prp – коло, біля, до*

C

cabin *n – хатина, кабіна*
cable *n – кабель, канат*
calculate *v* - *обчислювати*
calculation *n* - *розрахунок*
call *n – оклик, сигнал, виклик*
called *pp* - *викликаний*
cancel *v*- *скасовувати*
capability *n* - *здатність*
capable *a – здібний, здатний*
capacity *n – місткість, ємність*
capital *n – майно, капітал*
capture *v – брати у полон, захоплювати*
car *n – вагон, автомобіль*
carbon *n* - *вуглець*
career *n – кар'єра, успіх*
card *n* - *карта*
cardboard *n* - *картон*
care *n – турбота, уважність*
careful *a – дбайливий, обережний*
carefully *adv – обережно, уважно*
cargo *n* - *вантаж*
carrier *n* - *носій*
carry *v – носити, возити*
case *n – випадок, обставина*
cast *v – кидати, лити (метал)*
catch (caught) *v*- *ловити, спіймати*
cathode *n* - *катод*
cause *n – причина, підстава*
ceiling *n* - *стеля*
celebrity *n* - *знаменитість*
celestial *a небесний*
cell *n – келія, відсік, клітина*

cellular *a* - *клітинний*
centigrade *a – 100^0 за Цельсієм*
central *a* - *центральний*
centre *n – центр, середина*
centrifugal *a* - *відцентрований*
century *n – сторіччя, століття*
ceramic *a – гончарний, керамічний*
certain *a – певний, відомий*
certainly *adv* - *звичай*
chain *n – ланцюг, узи*
chamber *n – палата, кімната*
chance *n – випадок, шанс*
chancellor *n – канцлер, ректор*
change *n – зміна, дрібні гроші*
channel ***n*** **–** *протока, канал*
character *n – властивість, характер*
characteristic *n* - *характерний*
charge *n – навантаження, заряд*
chassis *n* - *шасі*
cheap *a* - *дешевий*
check up *v* - *перевіряти*
chemical *a* - *хімічний*
chemist *n* - *хімік*
chemistry *n* - *хімія*
chess *n* - *шахи*
chief *n – голова, начальник, шеф*
chip *n – скіпка, мікросхема, чіп*
choice *n* - *вибір*
choose (chose, chosen) *v* - *вибирати*
church *n* - *церква*
circle *n – коло, круг*
circuit *n – цикл, контур, схема*
circuitry *n – кругообіг, схема*
circular *a – круглий, циркулярний*
circumference *n – коло, периферія*
circumstance *n* - *обставини*
citizen *n* - *громадянин*
civil *a* - *громадянський*
claim *v* - *вимагати*
classify *v* - *класифікація*
clean *a* - *чистий*
clear *a – прозорий, зрозумілий*
clearly *adv – ясно, зрозуміло*
click *n* - *клацання*
climate *n* - *клімат*
close *v* - *зачиняти*
closely *adv – близько, тісно*
clothes *n, pl – одяг, убрання*
coal *n* - *вугілля*
coast *n* - *узбережжя*
coat *v* - *покривати*
code *n – кодекс, код, шифр*
coin *n* - *монета*
coincide *v* - *збігатися*
cold *n* - *холод*
collect *v* - *збирати*
college *n* - *коледж*
collaboration *n* - *співробітництво*
collision *n* - *зіткнення*
colour *n – колір, фарба*
combination *n – сполучення, поєднання*
combine *v* - *поєднувати*
combustion *n* - *згоряння*
come (came) *v – приходити*
comet *n* - *комета*
comfortable *a* - *зручний*
comforting *a* - *спокійний*
commemorate *v* - *вшановувати*
comment *n – примітка, коментар*
commerce *n* - *торгівля*
commercial *a* - *комерційний*
committee *n – комісія, комітет*
common *a* - *загальний*
commonly *adv* - *загально*
communicate (with) *v* - *повідомляти*
communication *n – зв'язок*
community *n – громада, община*
compact *a – стислий, щільний*
compare *v* - *порівнювати*
competence *n* - *спроможність*
competition *n* - *змагання*
compiler *n* - *компілятор*
complete *v* - *закінчувати*
completely *adv* - *цілком*
completion *n* - *завершення*
complex *a* - *складний*
complexity *n* - *складність*
complicated *a* - *складний*
component *n – складова частина*
compose *v* - *складати*
composite *a* - *складений*
composition *n – композиція, твір*
comprehensive *a* - *тямущий*
compress *v* - *стискувати*
compression *n* - *стиск*
comprise *v* - *містити*
computation *n* - *обчислення*
compute *v* - *обчислювати*
computer *n – комп'ютер*

computing device – *обчислювальний прилад*
concentrate *v* - *зосереджуватись*
concept *n* - *поняття*
concern *v* - *стосуватися*
conclusion *n* - *висновок*
condenser *n* - *конденсатор*
condition *n* - *умова*
conduct *v* - *проводити*
conductivity *n* - *провідність*
conference *n* - *конференція*
confidence *n – довір'я*
confident *a* - *довірливий*
confine *v* - *обмежувати*
confirm *v* - *підтверджувати*
connect *v – з'єднувати*
connection *n* - *сполучення*
conquer *v* - *завойовувати*
consequence *n – результат, важливість*
consequently *adv – отже, тому*
consider *v – розглядати, вважати*
considerable *a* - *значний*
consideration *n – розгляд, міркування*
consist (of) *v – складатися з*
constant *a* - *постійний*
constantly *adv* - *постійно*
constituent *n* - *складовий*
constitute *v – призначати*
construct *v* - *будувати*
construction *n – будова, споруда*
constructional *a* - *конструктивний*
consumer - *споживач*
consumption *n* - *споживання*
contain *v* - *містити*
content *n* - *задоволення*
continually *adv* - *безперервно*
continuation *n* - *продовження*
continue *v* - *продовжувати*
continuous *a* - *тривалий*
contribute *v – вносити, сприяти*
contribution - *внесок*
control *v* - *управляти*
controlled *a* - *керований*
controls *n* - *управління*
convenient *a – зручний, підходящий*
conventional *a* - *умовний*
convert *v* - *перетворювати*
cook *v* - *готувати*
cool *v* - *охолоджувати*
coolant *n* - *прохолодний*
cooling *n* - *охолодження*
cooperation *n* - *кооперація*
coordinate *v* - *узгоджувати*
coordinated *a* - *координований*
copper *n* - *мідь*
copy *n – копія, примірник*
corner *n – кут, куток*
corporation *n* - *корпорація*
correct *v* - *виправляти*
correlate *v – співвідносити*
correspond *v* - *відповідати*
corresponding *a* - *відповідний*
cost (cost) *v* - *коштувати*
council *n* - *рада*
country *n* - *країна*
countryside *n – сільська місцевість*
course *n – курс, напрям*
cover *v – накривати, охоплювати*
craft *n – ремесло, вправність*
create *v* - *творити*
creation *n* - *творення*
creature *n – створіння, жива істота*
crew *n* - *команда*
critical *a* - *критичний*
cross *v – переходити, переправлятися*
cruising – *морська подорож*
cryogenic *a* - *кріогенний*
crystal *n – кристал, кришталь*
crystalline *a* - *кристалічний*
cultivation *n – культивація*
current *n – потік, струм*
currently *adv – поточено, сьогодні*
curriculum *n – навчальний план*
cushion *n* - *подушка*
cycle *n – цикл, період*

D

daily *a* - *щоденний*
damage *n* - *пошкодження*
danger *n* - *небезпека*
dangerous *a* - *небезпечний*
dark *a* - *темний, похмурий*
darken *v* - *затемняти*
dash *n – порив, натиск*
data *n, pi – дані, відомості*
date back *v* - *датувати*
day *n* - *день*
deal (dealt) *v – мати справу, займатися*
dean *n* - *декан*

death *n* - *смерть*
decade *n* - *декада*
decide *v* - *вирішувати*
decision *n* - *рішення*
declare *v* - *оголошувати*
decline *v* - *нахилятися*
decorate *v* - *прикрашати*
decrease *v* - *зменшувати*
defect *n* - *недолік*
defend *n* - *захист*
define *v* - *визначати*
definite *a* - *визначений*
definition *n* - *визначення*
degree *n – ступінь, градус*
delay *n* - *затримка*
deliver *v – доставляти*
demand *v* - *вимагати*
demonstrate *v* - *показувати*
demonstration *n* - *показ*
dense *a – щільний, густий*
density *n* - *щільність*
deny v - *заперечувати*
department *n* - *відділ*
depend (on, upon) v - *залежати*
dependence *n* - *залежність*
dependent *a* - *залежний*
deposit *n – внесок, депозит*
depression *n* - *депресія, криза*
depth *n* - *глибина*
derive v -*одержувати, діставати*
descend v – *спускатися, сходити*
descendant *n* - *нащадок*
descent *n – спуск, зниження*
describe v - *описувати*
description *n – опис, зображення*
descriptive *a* - *описовий*
design v - п*роектувати*
desirable *a* - *бажаний*
desire v - *бажати*
desk *n* - *стіл*
despite *prp – не зважаючи на*
destination *n – місце призначення*
destroy v - *руйнувати*
destruction *n* - *знищення*
detail *n – деталь, подробиця*
detect v - *виявляти*
detection *n* - *виявлення*
determination *n* - *визначення*
determine *v* - *визначати*
develop *v* - *розвивати*
development *n* - *розробка*
deviation *n* - *відхилення*
device *n* - *прилад*
devote *v* - *присвячувати*
diagonal *a* - *діагональний*
diagram *n – графік, схема*
dial *n* - *диск*
diameter *n* - *діаметр*
dictionary *n* - *словник*
die *n – штамп, матриця*
differ *v* - *відрізнятися*
difference *n – різниця, відмінність*
different *a* - *різний*
differential *a – відмінний, характерний*
difficult *a* - *важкий*
difficulty *n* - *перешкода*
digital *a* - *цифровий*
dime *n – монета у 10 центів*
dimension *n* - *розмір*
direct v - *направляти*
direction *n* - *напрям, вказівка*
directly *adv* - *безпосередньо*
disadvantage *n – шкода, недолік*
disagree v – *суперечити*
disappear v - *зникати*
disappoint v - *розчаровувати*
disappointment *n* - *розчарування*
discourage v - *бентежити*
disconnect v – *роз'єднувати*
discover v - *відкривати*
discovery *a* - *відкриття*
discuss v - *обговорювати*
discussion *n* - *дискусія*
disintegrate v - *роздрібнювати*
disobey v - *підкорятися*
disorder *n – безладдя, плутанина*
display v - *показувати*
disposal *n – передача, розміщення*
distance *n* - *відстань*
distant *a* - *віддалений*
distinct *a – явний, виразний*
distinguish v - *відрізняти*
distort v - *спотворювати*
distribute v – *розподіляти, поширювати*
distribution *n* - *розподіл*
district *n – округ, район*
divide v - *поділяти*
dividend *n* - *дивіденд*
division *n* - *ділення, поділ*

domestic *a – внутрішній, домашній*
dominant *a - основний*
dormitory *n – спальня у гуртожитку*
dot *n - крапка*
double v - *подвоювати*
doubt *n - сумнів*
down *adv - вниз*
dozen *a - дюжина*
drag *v – тягнути, тягти*
draw (drew, drawn) *v - малювати*
drawing *n - креслення*
dream *n – сон, мрія*
drill *v – свердлити, тренувати*
drive (drove, driven) *v - водити*
drive *n - привід*
driver *n - водій*
drop *v – подати, знижувати*
drum *n - барабан*
dry *a – сухий, висохлий*
due to *prp – відповідно до, завдяки*
duration *n - тривалість*
during *prp - протягом*
Dutch *a - голландський*
duty *n – обов'язок*

E

each - *кожний*
early *a – рано, завчасно*
earth *n – земля*
easily *adv – легко, просто*
easy *a – легкий, зручний*
ecological *a - екологічний*
ecology *n - екологія*
economical *a - економічний*
economy *n - економія*
edge *n – вістря, лезо*
editing *n - видання*
educate *v – давати освіту, виховувати*
education *n - освіта*
effect *n – наслідок, результат*
effective *a - ефективний*
efficiency *n - ефективність*
efficient *a – умілий, ефективний*
effort *n – зусилля, напруження*
elect *v - вибирати*
electric *a - електричний*
electrical *a - електричний*
electricity *n – електрика*
electron - *електрон*
electronic - *електронний*
electronics - *електроніка*
element – *елемент*
elemental *a - початковий*
elementary *a - елементарний*
elevator n – *ліфт, елеватор*
eliminate v - *усувати*
elongate v – *розтягати, подовжувати*
else *adv – ще, крім*
emission n – *емісія, виділення*
emit v – *виділяти, випромінювати*
empire n - *імперія*
employ v – *наймати на роботу*
empty *a - порожній*
enable v – *давати змогу*
enclose v - *оточувати*
encode v - *кодувати*
end v - *закінчувати*
enemy n - *ворог*
energy *n - енергія*
extend v - *розширювати*
extensive a - *просторий*
extent *n - протяжність*
external *a - зовнішній*
extract v - *витягувати*
extreme *a - незвичайний*
extremely *adv - вкрай*

F

fable n – *байка, вигадка*
fabricate v - *підробляти*
fabricating n - *вигадування*
fabrication n - *вигадка*
face n – *обличчя, поверхня*
facilitate v - *сприяти*
facility n - *здібність*
fact *n – факт, подія*
factory *n - фабрика*
faculty n – *здібність, факультет*
fail v - *провалюватися*
failure n – *невдача, провал*
fair n - *ярмарок*
fall (fell, fallen) v - *падати*
fame n – *слава, репутація*
familiar a - *близький*
family n - *родина*
famous a - *відомий*
fantastic a - *фантастичний*
far a - *далекий*
farther a - *батько*
fashion n – *спосіб, стиль*
fast a – *міцний, швидкий*
fasten v - *прикріпляти*
fault n – *дефект, помилка*
favourite a - *улюблений*
fear n - *страх*
feature n – *особливість, риса*
feed (fed) v – *живити, годувати*
feel (felt) v - *почувати*
feeling n - *почуття*
female a - *жінка*
ferromagnetic a - *феромагнетик*
few *adv – мало, небагато*
fibre n - *волокно*

fiction n – *художня література*
field n – *поле, галузь*
fight (fought) v – *битися, боротися*
fill v - *наповнювати*
film n – *плівка, фільм*
final a – *кінцевий, останній*
finally adv - *нарешті*
find (found) v - *знаходити*
finger n – *палець, стрілка, шрифт*
finish v - *закінчувати*
firearm n – *вогнепальна зброя*
first a - *перший*
fisherman n - *рибалка*
fit v - *підходити*
fix v – *укріпляти, призначати*
flame n - *полум'я*
flat a – *плоский, рівний*
flexible a - *гнучкий*
flight n - *політ*
flirt v - *фліртувати*
float v – *плавати (на поверхні)*
floor n – *підлога, поверх*
flow v - *текти*
flower n - *квітка*
fluid n - *рідина*
fly (flew, flown) v - *літати*
flying n - *політ*
flywheel n – *махове колесо*
follow v - *дотримуватись*
follower n - *послідовник*
following a - *наступний*
food n – *їжа, корм*
force n – *сила, міць*
foreign a - *іноземний*
forest n - *ліс*
forget (forgot, forgotten) v - забувати
fork n - *виделка*
form v – *набувати форми*
formal a - *формальний*
former a – *творець, модель*
formula n - *формула*
formulae *n – формула (мн.)*
formulate v - *формулювати*
fortification *n* - *укріплення*
fortune *n – щастя, доля*
forward *a* - *передовий*
fossil *n* - *застарілий*
found v - *засновувати*
foundation n – *основа, базис*
founder *n* - *засновник*
fraction n - *частка*
frame n - *каркас*
free a - *вільний*
freedom n – *свобода, воля*
freight n - *вантаж*
frequency *n* - *частота*
frequent *a* - *частий*
frequently *adv* - *часто*
freshman n – *студент першого курсу*
friction n - *тертя*
front a - *передній*
frost n - *мороз*
fruitful *a* - *плодотворний*
fuel *n – паливо, пальне*
fulfil v - *виконувати*
full *a* - *повний*
fully *adv* - *цілком*
furnace *n* - *піч, топка*
further *a – далі, потім*

G

game *n – гра, партія*
gap n – *брешь, щілина*
gas n – *газ, бензин*
gasolene n – *газолін, бензин*
gather v - *збирати*
gear *n* - *механізм*
general a - *загальний*
generally *adv* - *взагалі*
generate v - *породжувати*
generation n - *покоління*
generator n - *генератор*
genius n - *геній*
geography n - *географія*
giant *a – гігантський*
go (went, gone) v – *іти, ходити*
gold *n* - *золото*
good *a – добрий, гарний*
govern v - *керувати*
government n – *уряд, правління*
gown n – *плаття, сукня*
graduate v – *закінчувати вищий заклад*
graduation n - *закінчення*
gram *n* - *грам*
grant *n – дозвіл, згода, стипендія*
gravitation n - *тяжіння*
gravity n - *важливість*
great' *a* - *великий*
greatly *adv* - *дуже*
greet v - *вітатися*
group *n – група, фракція*
growth *n – рости, збільшувати*
guidance n - *керівництво*
guide *n – дід, провідник*

H

half n - *половина*
hall n – *зал, хол*
hammer n - *молоток*
hand n – *рука, стрілка (годинника)*
handle v – *передавати, вручати*
handling – *обробка, передача*
hang (hung) v – *вішати, підвішувати*
happen v - *траплятися*
happy *a* - *щасливий*
hard a – *твердий, жорсткий, важкий*
hardly *adv – наполегливо, важко*
hate v - *ненавидіти*
head *n – голова, керівник*
headlight *n – фара автомобіля*
health *n – здоров'я*
hear (heard) v – *чути, слухати*
heart *n – серце, душа*
heat *n – спека, жар*
heating *n* - *нагрівання*
heavy *a* - *важкий*
heel *n – п'ята, каблук*
height *n – висота, зріст*
helium *n* - *гелій*
help *n* - *допомога*
hence *adv* - *отже*
hidden *pp* - *ховати*
high *a* - *високий*
higher *a* - *вище*
highway *n* - *шосе*
historical *a* - *історичний*
history *n* - *історія*
hold (held) v - *тримати*
hole *n – дірка, отвір*
hope n - *надія*
horizontal *a* - *горизонтальний*
hose n **–** *панчішні вироби*
hostel n - *гуртожиток*
hot *a* - *гарячий, жаркий*
house *n – дім, будинок*
hover v - *ширяти*
how *adv – як, яким чином*
however *adv* - *проте, однак*
huge *a* - *величезний*
hull *n – шкарлупа, лушпина*
human *a* - *людський*
humanity n - *людство*
hydraulic *a* - *гідравлічний*
hydraulics n - *гідравліка*
hydrogen n - *водень*
hypersonic a - *надзвуковий*

I

idea n – *ідея, думка*
identical *a* - *однаковий*
identify v - *розпізнавати*
i.e. - that is - *тобто*
ignite v - *запалюватись*
ignition n - *загоряння*
illuminate v - *освітлювати*
image n – *зображення, образ*
imagination n - *уява*
imagine v - *уявляти*
immediately *adv* - *негайно*
immensely *adv* - *надзвичайно*
impact n – *удар, поштовх*
impassable a - *непрохідний*
imperative a - *владний*
imperfect a - *недосконалий*
implement v – *знаряддя, інструмент*
implementation n - *виконання*
importance n - *важливість*
important *a* - *важливий*
impose v – *нав'язувати*
impossible a - *неможливий*
impress v - *справляти враження*
impressible *a* - *вразливий*
impression *n* - *враження*
imprint v – *відбиток, слід*
improve v - *поліпшувати*
improvement *n* - *поліпшення*
impurity *n – бруд, домішка*
in *prp – у, в, на*
inaccuracy *a – неточність, помилка*
inattentive *a* - *неуважний*
inch n (2,54 см) - *дюйм*
incline v – *нахиляти, схиляти*
include v – *містити, включати*
incomplete a - *незакінчений*
inconvenient a - *незручний*
incorporate v – *об'єднувати, приймати*
incorrect a - *неправильний*
increase v - *зростати*
increasingly *adv* - *значно*
incredible *a* - *неймовірний*
indeed *adv* - *справді*
indefinite *a* - *невизначений*
independence *n* - *незалежність*
independent *a* - *незалежний*
indestructible *a* - *нерушимий*

indicate v - *вказувати*
indicator n - *індикатор*
indirect a - *посередній*
individual *a* - *особистий*
induction n - *індукція*
industrial *a* - *промисловий*
industry n - *промисловість*
ineffective a - *марний*
inertia n - *інерція*
inertness *n* - *інертність*
influence v - *впливати*
inform v - *повідомляти*
information *n* - *повідомлення*
inhabit v - *мешкати*
initial *a* - *початковий*
initiate v - *починати*
inject v - *вводити*
inlet n – *затока, бухта*
input n - *введення*
inside n – *внутрішня частина*
insist v - *наполягати*
inspect v - *оглядати*
install v - *встановлювати*
installation n - *установка*
instance *n – приклад, зразок*
instant *n – мить, момент*
instead *adv – замість того*
institute v - *засновувати*
institution n - *навчання*
instruct v - *навчати*
instruction n - *інструкція*
insulate v - *ізолювати*
integrate v - *інтегрувати*
intelligence n – *розум, інтелект*
intend v – *мати намір*
intensify v - *посилювати*
intensity n - *напруженість*
intensive a - *інтенсивний*
intent *a* - *уважний*
intention n – *намір, мета*
interaction n - *взаємодія*
interchangeable *a* - *обмінювальний*
interconnect v – *взаємопов'язувати*
interesting *a* - *цікавий*
interference n – *втручання, перешкода*
interior n - *нутрощі*
internal *a* - *внутрішній*
interrupt v – *переривати, заважати*
interval n – *проміжок, інтервал*
interview n – *зустріч, бесіда*
introduce v - *вводити*
invade v - *захоплювати*
invent v - *винаходити*
invention n - *винахід*
investigate v - *розслідувати*
investigation n - *дослідження*
investment n - *вклад*
invisible *a* - *невидимий*
invite v - *запрошувати*
involve v – *містити, включати (в собі)*
iron n - *залізо*
issue v – *випуск, вихід*
item n – *пункт, стаття, параграф*

J

jam n – *тиснява, давка*
jet n – *реактивний двигун*
job n – *робота, заняття*
join v - *з'єднувати*
joint n – *стик, з'єднання*
journey n - *мандрівка*
junior *a* - *молодший*

K

keep (kept) v - *зберігати*
key n – *ключ, клавіша*
kick *n* - *удар ногою*
kill v - *убивати*
kilometer n - *кілометр*
kind n – *різновид, клас*
kindergarten n – *дитячий садок*
knock v – *бити, ударяти*
know (knew, known) v - *знати*
knowledge n - *знання*

L

label n - *ярлик*
laboratory = **lab** n - *лабораторія*
labour n – *праця, робота*
lack v - *не вистачати*
lane n - *стежка*
land n –*земля, суша*
language n - *мова*
lantern n - *ліхтар*
large a - *великий*
largely *adv – значною мірою*
laser n - *лазер*
last v - *тривати*

late *a – пізній*
lately *adv – останнім часом*
later *a* - *пізніший*
latter (the latter) a - *останній*
latitude n - *широта*
laugh v - *сміятися*
launch v - *запускати*
law n – *закон, право*
lay (laid) v – *класти, накривати*
lead n - *свинець*
lead (led) v – *вести, проводити*
leader n – *керівник, лідер*
learn (learnt) v – *вчити, вивчати*
learning n – *вивчення, знання*
leave (left) v – *залишати, покидати*
lecture n - *лекція*
left a - *лівий*
length n – *довжина, відстань*
lengthy *a – довгий, розтягнутий*
lest *cj – щоб ... не, як би не...*
let (let) v - *дозволяти*
letter n – *буква, лист*
level n - *рівень*
lie (lay, lain) v – *обман, брехня*
lifeboat n – *рятувальний човен*
lift n – *підйом, ліфт*
light n; **(lit, lighted)** v - *світло*
lighten v - *полегшувати*
lighting n - *освітлювач*
like v - *подобатися*
likely *adv – ймовірно, певно*
limit v - *обмежувати*
limitation n - *обмеження*
line n – *лінія, ряд, черга*
linear *a* - *лінійний*
link v – *зв'язувати*
liquid *a* - *рідкий*
list n – *список, перелік*
listen (to) - *слухати*
little *adv* - *мало, небагато*
live v – *жити, існувати*
load v - *вантажити*
local a - *місцевий*
locate v - *розміщати*
location n – *місце знаходження*
lock v - *замикати*
long *a – довгий, тривалий*
longitud *n* - *довгота*
look *n – погляд, вираз*
lorry *n* - *грузовик*
lose (lost) v – *втрачати, губити*
loss *n – втрата, збиток*
love v – *любити, кохати*
luck *n – доля, удача*
lunar *a* - *місячний*
luxury *n* - *розкіш*

M

machine v - *піддавати механічній обробці*
madman *n* - *божевільний*
magazine *n* - *журнал*
magnificent *a* - *чудовий*
mail *n* - *пошта*
main a - *головний*
mainly *adv – переважно*
maintain v - *підтримувати*
maintenance *n* - *підтримка*
major *a* - *головний*
majority n - *більшість*
make v - *виготовляти*
management *n* - *управління*
maneuver v - *маневрувати*
mankind *n* - *людство*
manner *n – спосіб, манера*
manufacture v - *виробляти*
manufacturer *n* - *виробник*
marine *a* - *морський*
mark *n – знак, позначка*
marking *n* - *штампування*
mass *n – маса, безліч*
master v – *оволодівати, управляти*
match v – *відповідати, підходити*
material *n* - *матеріал*
mathematics *n* - *математика*
matter *n – справа, питання*
meal *n* - *їжа*
mean (meant) v - *означати*
meaning *n* - *значення*
means *n – засіб, спосіб*
meanwhile *adv* - *тим часом*
measure *n* - *міра*
measurement *n* - *вимірювання*
medicine *n – медицина, ліки*
medium *n – середовище, середина*
meet (met) v - *збиратися*
meeting *n – збори, засідання*
melt *n* - *плавлення*
member *n* - *член*
memorial *n – пам'ятник*
memory *n – пам'ять*
mention v - *згадувати*

mercury *n* - *ртуть*
metallurgist *n* - *металург*
metallurgy *n* - *металургія*
meter *n* - *лічильник*
method *n – метод, спосіб*
microchip *n* - *мікросхема*
middle *a* - *середній*
mile *n* - *миля*
military *a* - *військовий*
mind *n – розум, думка, погляд*
minute *n* - *хвилина*
minute *a* - *дрібний, крихітний*
missile *n – реактивний снаряд*
mission *n – місія, доручення*
mistake *n* - *помилка*
mixture *n* - *суміш*
mobile a - *рухомий*
mobility *n* - *рухомість*
modest *a* - *скромний*
money *n* - *гроші*
monitor *n* - *наставник*
monitoring *n* - *спостереження*
moor v - *швартуватися*
more or less *adv;* **more than –** *більш або менш*
moreover adv – *крім того*
most *n – найбільша кількість*
mostly *adv – головним чином*
motion *n* - *рух*
motor *n* - *двигун*
mount v – *підніматися, монтувати*
mounting *n* - *монтаж*
move v – *рухатися, переїжджати*
movement *n* - *рух*
much *a* - *багато, дуже*
multitude *n* - *безліч*
mysterious *a* - *таємничий*

N

nail *n – ніготь, цвях*
name *n – ім'я, назва*
namely *adv – саме, тобто*
natural *a* - *природний*
nature *n* - *природа*
navigation - *навігація*
navy *n* - *землекоп*
near *adv – поблизу, майже*
nearly *adv* - *приблизно*
necessary *a* - *необхідний*
necessity *n* - *необхідність*
need *n* - *потреба*
needle *n – голка, стрілка*
negative *a* - *заперечний*
network *n* - *мережа*
never *adv* - *ніколи*
news *n – новини, звістка*
newspaper *n* - *газета*
next *a* - *наступний*
nickel *n* - *нікель*
night *n* - *ніч*
non-traditional *a* - *нетрадиційний*
nose *n* - *ніс*
notable *a* - *визначний*
notation *n* - *нотація*
note v – *звертати увагу*
notebook *n – записна книжка*
nothing - *ніщо, нічого*
notice v - *помічати*
novelty *n – новизна, новинка*
now *adv – тепер, відразу*
nowadays *adv* - *тепер, у наш час*
nowhere *adv* - *ніде, нікуди*
nuclear *a* - *ядерний*
nucleus *n* - *ядро, центр*
number *n – число, номер*
numerical *a – числовий, цифровий*
numerous *a – численний*

O

obey v – *коритися, слухатися*
object *n – заперечення, протест*
observation *n* - *спостереження*
observatory *n* - *обсерваторія*
observe v - *виконувати*
obtain v – *здобувати, одержувати*
obvious *a* - *очевидний*
occasion *n* - *випадок*
occupy v; **to be occupied** - *займати*
occur v - *траплятися*
ocean *n* - *океан*
offer v - *пропонувати*
office *n* - *служба, контора*
official *n – урядова особа*
often *adv* - *часто*
oil *n – олія, нафта*
old *a* - *старий*
on *prp* - *на*
once *adv – одного разу*
one - *один*
only *a – тільки, виключно*
open *a* - *відкритий*
operate v – *діяти, працювати*
operation *n – дія, робота*
operator *n* - *оператор*
opinion *n – думка, погляд*

opportunity *n* - *можливість*
oppose v – *чинити опір*
opposite *a* - *протилежний*
opposition *n* - *опір*
oppress v - *пригнічувати*
oppressive *a* - *жорстокий*
optical *a* - *оптичний*
optics *n* - *оптика*
oral *a* - *усний*
orange *a* - *помаранчевий*
orbit *n* - *орбіта*
order in - to, - *порядок, для того*
ordinary *a* - *звичайний*
organization *n* - *організація*
organize v - *влаштовувати*
origin *n – джерело, початок*
original *a* - *початковий*
other *a* - *ще один, інший*
others *n* - *інші*
otherwise *adv – інакші, або ж*
outer *a* - *зовнішній*
outline *n* - *контур*
output *n – випуск, продукція*
outside *a* - *зовнішній*
outstanding *a* - *видатний*
over *prp – над, через, коло*
overall *a* - *загальний*
overcome (overcame) v - *побороти*
overestimate *v- переоцінювати*
overload v - *перевантажувати*
owing to *prp* - *завдяки*
own *a – свій, власний*

P

pack *n – тюк, пакунок, упаковка*
package *n* - *упаковка*
paint v – *фарбувати, малювати*
painter *n* - *художник*
palace *n* - *палац*
panel *n* - *панель*
paper *n – папір, стаття*
parents *n* - *батьки*
park v - *паркуватись*
parking *n* - *паркування*
part *n* - *частина*
partial *a* - *частковий*
partially *adv* - *частково*
particle *n* - *частка*
particular *a* - *особливий*
particularly *adv* - *зокрема, особливо*
pass v; - **examinations** - *складати іспити*
passage *n – прохід, проїзд*
passenger *n* - *пасажир*
passive *a* - *пасивний*
past *a* ; *adv – повз, поза межами*
path *n – доріжка, шлях*
pathway *n – стежка, доріжка*
pattern *n – зразок, модель*
pave v - *вистилати*
pay (paid) v - *сплачувати*
peace *n – мир, спокій*
pearl *n* - *перлина*
peculiar *a* - *особливий, незвичайний*
peculiarity *n* - *особливість*
pedagogical *a* - *педагогічний*
penetrate v - *проникати*
people *n – народ, нація*
per *prp* - *за одиницю часу*
per cent *n* - *процент*
perfect *a* - *досконалий*
perfect v - *удосконалювати*
perform v - *виконувати*
performance *n* - *виконання*
perhaps *adv* - *можливо*
period *n – цикл, період*
periodical *a* - *періодичний*
periodicity *n* - *періодичність*
permanent *a* - *постійний*
permission *n* - *дозвіл*
permit v - *дозволяти*
persist v - *наполягати*
person *n – особа, персона*
personal *a* - *особистий*
petrol *n – бензин, газолін*
phase *n – фаза, етап*
phenomenon *n* - *явище*
philosophy *n* - *філософія*
Ph.D. – *доктор філософії*
photo *n* - *фото*
physical *a* - *фізичний*
physicist *n* - *фізик*
physics *n* - *фізика*
pick up v - *підбирати*
picture *n* - *малюнок*
piece *n – шматок, кусок*
pillow *n* - *подушка*
pilot v - *пілот*
pipe *n* - *труба*
piston *n* - *поршень*
place v - *розміщати*
plan v - *планувати*
planning *n* - *планування*
plane *n – площина, літак*
plane - *плоский*
planet *n* - *планета*
planetary *a* - *планетарний*
plant *n – завод, установка*

plate *n – пластина, тарілка*
platform *n - платформа*
play v *– грати, виконувати*
please *- догоджати*
pleasure *n - задоволення*
plug v *– вмикати, пломбувати*
pocket *n - карман*
point *n – крапка, суть, мета, кінчик*
pole *n - полюс*
policy *n - політика*
polite *a - ввічливий*
pollute v *- забруднювати*
pollution *n - забруднення*
polygon *n - полігон*
popular *a - популярний*
population *n – населення, заселення*
portable *a – портативний, складний*
position *n – позиція, посада*
possess v *- володіти*
possibility *n - можливість*
possible a *- можливий*
post *n – стовп, підпірка, пошта*
postmaster *n – начальник поштового відділення*
postoffice *n - пошта*
pound *n* (453 r) *– фунт, фунт стерлінгів*
power *n – сила, міць, енергія*
powerful *a – могутній, сильний*
practical *a – практичний, фактичний*
practically *adv - фактично, дійсно*
practice *n - практика, навичка*
pre-arranged *a - передбачений*
precede v *- передувати*
precision *n - точність, влучність*
predetermined *a – визначений наперед*
predict v *- передрікати, прогнозувати*
prediction *n - твердження, прогноз*
prefer v *- віддавати перевагу*
preliminary a *- попередній*
premium *n - премія, нагорода*
preparation *n - підготовка*
prepare v *- підготовлювати*
preparatory a *- підготовчий*
presence *n - присутність*
present v *– підносити, дарувати*
present *a - сучасний, теперішній*
preset *a - запрограмований*
pressure *n - тиск*
prevent v *- запобігати*
previous *a - попередній*
previously *adv - заздалегідь*
price *n - ціна*
prime mover *n – первинний двигун*
primitive *a - примітивний*
principal *a - головний*
principle *n – начальник, директор*
print *n – відбиток, слід, друк*
priority *n - пріоритет*
private *a - приватний*
privately *adv - особисто*
prize *n - приз*
probe *n - проба*
problem *n – проблема, завдання*
proceed v *- продовжувати*
process v; *n – обробляти, процес*
processing *n - обробка*
produce v *- виробляти*
producer *n - виробник*
product *n - продукт*
production *n - виробництво*
productivity *n - продуктивність*
program(me) *n – програма, план*
programmable *a - програмований*
progress *n – просування, рух*
project *n - проект, план*
projectile *n - реактивний снаряд*
prolonged *pp - довгий*
prominent *a - видатний*
promise v *- обіцяти*
promising *- обіцянка*
promptly *adv – швидко, відразу*
proof *n - доказ*
propagation *n - розповсюдження*
propel v *- просувати вперед, приводити в рух*
propellant *n - паливо*
proper *a – власний, належний*
properly *adv – належним чином*
property *n – власність, властивість*
proportion *n – пропорція, частина*
propose v *– пропонувати, передбачати*
propulsion *n - просування*
prospects *n – плани на майбутнє*
prospective *a – очікуваний, майбутній*
protect v *- захищати*
protection *n – захист, охорона*
proton *n - протон*
prove v *– доводити, засвідчувати*
provide v *– посвідчувати, забезпечувати*
provided *cj – за умови*
public *a - громадський*

publication *n* - *видання*
publish v – *публікувати, видавати*
pulley *n* - *блок*
pump *n* – *насос, помпа*
punch v - *пробивати, компостирувати*
punching *n* - *штампування*
pupil *n* – *учень, вихованець*
pure *a* – *чистий, бездоганний*
purity *n* - *чистота*
purpose *n* – *намір, мета*
push v – *штовхати, натискати*
put (put) v – *класти, ставити*

Q

qualification *n* - *кваліфікація*
qualified a - *кваліфікований*
quality *n* – *якість, особливість*
quantitative *a* – *кількісний*
quantity *n* - *кількість*
question *n* – *запитання, питання*
questionable *a* - *проблемний*
quick *a* – *швидкий, моторний, жвавий*
quiet *a* – *тихий, спокійний*
quite *adv* – *зовсім, цілком*

R

race *n* – *гонка, змагання в швидкості*
radar *n* - *радар*
radiate v - *випромінювати*
radiation *n* - *випромінювання*
radically *adv* - *радикально*
radio *n* - *радіо*
random *a* - *випадковий*
range *n* – *діапазон, коло, ряд*
rapid *a* - *швидкий*
rate *n* – *норма, темп*
rather *adv* - *надто, досить*
ratio *n* - *відношення*
ray *n* - *промінь*
reach v - *досягати*
read (read) v - *читати*
readily *adv* - *охоче*
reading *n* - *читання*
ready *a* - *готовий*
real *a* – *дійсний, реальний*
reality *n* - *реальність*
realize v - *визнавати*
really *adv* - *дійсно, насправді*
rear *a* - *тильний, задній*
rearward *adv* - *назад*
reason *n* - *причина*
reasonable *a* - *розумний*
receive *v* - *отримувати*
receiver *n* - *приймати*
recent *a* - *останній, недавній*
recently *adv* - *недавно*
recognition *n* - *визнання*
recognize *v* - *визнавати*
recollect *v* - *згадувати*
recommendation *n* - *порада*
reconstruct *v* - *відновлювати*
record *v* - *записувати*
recreation *n* – *відпочинок, відновлення сил*
recycle *v* - *повернути в початковий стан*
reduce *v* - *зменшувати*
reduction *n* - *зниження*
re-entry *n* - *вхід*
refer *v* - *посилатись(на)*
reference book *n* - *довідник*
reflect *v* - *відбивати*
reflection *n* - *відображення*
refuse *v* - *відмовляти*
regard *v* - *розглядати, гадати*
regulate *v* - *регулювати*
relate *v* - *зв'язувати, відносити*
relation *n* - *співвідношення*
relative *a* - *відносний*
relatively *adv* - *відносно, відповідно*
relativity *n* - *відносність*
relax *v* - *розслаблятись*
reliability *n* - *надійність*
reliable *a* - *надійний*
rely (on, upon) *v* - *покладатись*
remain *v* - *залишатись*
remains *n* - *залишки*
remarkable *a* – *чудовий, видатний*
remember *v* – *пам'ятати*
remote *a* - *дистанційний*
remove *v* - *вилучати*
renewal *n* - *оновлення*
repair *v* - *ремонтувати*
repeat *v* - *повторювати*
replace *v* - *замінювати*
replenish *v* - *поповнювати*
reply *n* - *відповідь*
report *v* – *доповідати*
represent *v* – *зображати, представляти*
representative *n* - *представник*
require v - *вимагати*
requirement *n* – *вимога, потреба*
rescue ~ craft - *рятувальне судно*

research v - *досліджувати*
resemble v - *бути схожим (на)*
resist v - *опиратись, чинити опір*
resistance *n* - *опір*
resistant *a* **heat** ~ - *теплостійкий*
resistivity *n* - *опір*
resolve v - *вирішувати*
resource *n* - *джерело*
respect *n – повага, відношення*
responsible *a* - *відповідальний*
rest *n – спокій, відпочинок*
restore v - *відновлювати*
result *n* - *результат*
retain v - *зберігати, утримувати*
retire v – *виходити у відставку*
retrieve v - *знаходити*
return v - *повертатися*
reveal v – *показувати, знаходити*
reverse v - *повертати в протилежному напрямку*
revision *n* - *перегляд*
rich *a* - *багатий*
right *a* - *правий, правильний*
ring *n – дзвінок, кільце*
rise (rose, risen) v - *збільшувати*
road *n* - *шлях, дорога*
rocket *n* - *ракета*
roll v - *обертати, скручувати*
roller *n* - *хвиля, ролик*
rolling *n* - *обертання*
roof *n – дах, притулок*
rotary *a* - *обертальний*
round *a* - *круглий, повний*
route *n* - *маршрут*
row *n* - *ряд*
ruin *n* - *загибель*
rule *n* - *правило*
run (ran, run) v - *бігати, управляти,*
rural *a* - *працювати*

s

safe *a* - *надійний. безпечний*
safely *adv* - *надійно*
safety *n* - *безпека*
sail v - *пливти під парусами*
sailor *n* - *моряк*
same *a* - *той самий, однаковий*
sample *n – зразок, проба*
sand *n* - *пісок*
satellite *n супутник*
satisfactory *a* - *задовільний*
satisfy v - *задовольняти*
save v - *заощаджувати, рятувати*
saving *a* - *зекономлений, ощадливий*
scale *n – розмір, масштаб*
scan v - *сканувати*
scanning *n* - *сканування*
scarcely *adv – ледве, навряд чи*
scattered a - *розкиданий*
schedule *n – розклад, графік*
scheme *n – схема, план*
scholar *n – вчений, стипендіат, освічена людина*
science - *наука*
scientific a - *науковий*
scientist *n – науковець, вчений*
screen *n – екран, щит*
screw *n* - *гвинт*
sea *n* - *море*
seal *n – печатка, пломба*
seaman *n* - *моряк*
search *n – пошук, дослідження*
seat *n – місце, сидіння*
secondary *a* - *повторний, другорядний*
section *n – розділ, секція*
seem v - *здаватися*
seize v - *хапати, захоплювати*
seldom *adv* - *рідко*
select v - *вибирати*
self-governing *a* - *самоуправління*
self-moving *a* - *саморухомий*
self-propelled *a* - *самохідний*
sell (sold) v - *продавати*
semiconductor *n* - *напівпровідник*
send (sent) v - *відправляти*
senior *n* - *старший*
sense *n – почуття, свідомість*
sensitive *a* - *чутливий*
sensor *n – сенсор, датчик*
sensory *a* - *чутливий*
separate v – *розділяти, відділяти*
sequence *n* - *послідовність*
series *n – серія, комплекс*
serious *a* - *важливий*
serve v - *служити, обслуговувати*
service *n* - *служба*
session *n – сесія, засідання*
set *n – набір, прилад*
settlement *n* - *поселення*
several *a* - *окремий*
severe *a – суворий, строгий*
sewing *n* - *шиття*

shake v - *трусити*
share *n – частка*
sharp *a – гострий, чіткий*
shatter v - *розбивати*
sheet *n – аркуш, лист*
shell *n - оболонка*
shine (shone) v - *світити, сяяти*
ship *n - судно*
shipbuilding *n - суднобудівництво*
shipyard *n - верф*
shock *n – удар, поштовх, шок*
shop *n – крамниця, майстерня*
shore *n – берег, підпірка*
short *a - короткий*
shortage *n – нестача, недостача*
shot *n - постріл*
shout v - *кричати*
show v - *показувати*
shower *n – злива, душ*
shut (shut) v - *зачиняти*
side *n – бік, сторона*
sight *n – зір, погляд, видовище*
sign v *– відзначати, підписувати*
signal *n - сигнал*
signature *n - підпис*
significance *n - значення*
significant *a - значний*
silicon *n – кремній, силікон*
silver *a - сріблястий*
similar *a – схожий, подібний*
similarity *n – схожість, подібність*
similarly *adv - подібно*
simple *a - простий*
simplicity *n - простота*
simplify v - *спрощувати*
simulate v *– удавати, моделювати*
simultaneous *a - одночасний*
since *adv – після, відтоді*
single *a – самотній, єдиний*
sink (sank, sunk) v - *тонути*
site *n - місце*
situated *a - розташований*
situation *n – ситуація, стан*
size *n – розмір, величина*
skill *n – майстерність, уміння*
skilled *a - кваліфікований*
skin *n - шкіра*
sky *n - небо*
skyscraper *n - хмарочос*
slightly *adv – легко, незначно*
slow *a – повільний, тихий*
small *a - маленький*
smile v - *усміхатися*
smog *n - смог*
smoke v - *палити*
snappy a - *раптовий*
so *adv – так, настільки*
society *n - суспільство*
soft *a – м'який, приємний*
soil *n – земля, грунт*
solar *a - сонячний*
solid *a - твердий*
solution *n – розчин, вирішення*
solve v - *вирішувати*
soon *adv - незабаром*
sophisticated *pp - складний*
sorry - *засмучений*
sort *n – сорт, вид, рід*
sound *n – звук, шум*
source *n - джерело*
space *n - простір*
spark *n – іскра, спалах*
special *a - особливий*
speciality *n - спеціальність*
specialization *n - спеціалізація*
specialize v - *спеціалізуватись*
specific *a - особливий*
specification *n - специфікація*
specify v *– точно визначати*
specimen *n - зразок*
spectacular *a - ефективний*
speed *n - швидкість*
spend (spent) v - *витрачати*
spill (spilt, spilled) v - *розливати*
splendid *a - блискучий*
spoke *n – спиця, щабель*
sponsor *n - поручитель*
spoon *n - ложка*
spread (spread) v - *поширювати*
square *n – квадрат, площа*
squeeze v - *стискувати*
stable *a – міцний, сталий*
stabilizer *n - стабілізатор*
staff *n – штат, персонал*
stage *n – сцена, стадія, етап*
stamp *n – штамп, марка, пломба*
standard *n – стандарт, норма*
standpoint *n – точка зору*
start v *– вирушати, починати*
starter *n - стартер*
state *n – стан, держава*
statement *n – заява, твердження*
state-of-art *n – стан, розвиток*
station *n - станція*

stationary *a – нерухомий, стаціонарний*
stay v - *залишатися*
staying *a* - *перебуваючий*
steady *a – стійкий, постійний*
steam *n* - *пара*
steel *n* - *сталь*
step *n* - *крок*
still *adv – досі, все ще*
stone *n – камінь, кісточка*
stop v *– припиняти, зупиняти*
storage *n – зберігання, склад*
store v *– зберігати, запам'ятати*
storey *n* - *поверх*
story *n* - *оповідання*
straight *a* - *прямий*
strange *a – дивний, незнайомий*
stream *n – потік, струмок*
strength *n – сила, міцність*
strengthen v - *зміцнювати*
stress *n – тиск, наголос*
stretch v - *простягатися*
strike (struck, stricken) v *– бити*
striking *a* - *вражаючий*
stroke *n – удар, хід, прийом*
strong *a – міцний, дужий, сильний*
structural *a* - *структурний*
structure *n* - *структура*
student body - *кількість студентів*
study *n – вивчення, заняття, кабінет*
stupid *a – дурний, глупий*
subject *n – тема, підмет*
submerge v - *занурювати*
subsequent *n* - *наступний*
substance *n* - *речовина*
substitute v - *заміняти*
suburb *n* - *околиці*
succeed v *– мати успіх*
success *n* - *успіх*
such - *такий*
sudden *a* - *раптовий*
suddenly *adv* - *раптом*
suffer v - *страждати*
sufficient *a* - *достатньо*
suffix *n* - *суфікс*
suggest v - *пропонувати*
suit v - *влаштовувати*
suitable *a* - *придатний*
sum *n – сума, підсумок*
superintendent *n* - *наглядати*
superior *a – вищої якості*
supplement *n* - *додаток*
supply v - *постачати*
support v - *підтримувати*
supporter *n* - *прихильник*
suppose v - *вважати*
suppression *n* - *стримування*
sure *a* - *упевнений*
surely *adv* - *звичайно*
surface *n – поверхня*
surpass v - *переворушувати*
surprise v - *дивувати*
surprising *a* - *несподіваний*
surprisingly *adv* - *зненацька*
surround v - *оточувати*
surrounding *a* - *оточуючий*
survey *n* - *досліджувати*
survival *n* - *виживання*
switch *n* - *вимикач*
sword *n* - *шабля*
system *n* - *система*

T

table *n – стіл, таблиця*
take (took, taken) v - *брати*
talk v - *розмовляти*
tank *n* - *резервуар*
tape *n* - *стрічка*
tape-recorder *n* - *магнітофон*
task *n – задача, завдання*
tax *n* - *податок*
tea *n* - *чай*
teach (taught) v *– навчати, учити*
teacher *n* - *вчитель*
technical *a* - *технічний*
technique *n – технічний прийом*
technological *a* - *технологічний*
technology *n* - *технологія*
telegram *n* - *телеграма*
telegraph *n* - *телеграф*
telephone *n* - *телефон*
television *n* - *телебачення*
tell (told) v - *розповідати*
temperature *n* - *температура*
thing *n – річ, предмет*
think (thought) v - *думати*
thinking *n* - *міркування*
tend v **throughout** *adv* - *прямувати*
tendency *n* - *тенденція*
term *n – строк, термін*
territory *n* - *територія*
test v *– випробовувати, перевіряти*
than *cj* - *ніж, від, за*
thank v - *дякувати*
that is - *тобто*

then *adv - потім*
thereby *adv – таким чином*
therefore *adv – тому, отже*
thermal *a - тепловий*
thick *a – товстий, густий*
thin *a - тонкий, худий*
thorough *a - досконалий*
thoroughly *adv - старанно*
though *cj - про, хоча*
thought *n - думка*
threshold *n - поріг*
through *prp – через, крізь*
thrust *n - штовхати*
thus *adv – таким чином*
till *prp – до, доти, поки*
time *n – час*
tin *n - олово*
tiny *a - крихітний*
tired *a - стомлений*
title *n – крихітка, заголовок*
to-day *adv - сьогодні*
together *- разом*
too *adv - також*
tool *adv - знаряддя*
top *n - верхівка*
total *n - підсумок*
touch v *- торкатися*
tough *a - жорсткий, щільний*
toughness *n - жорсткість*
tour *n - подорож*
towards *prp – у напрямі до*
tower *n – вишка, башта*
track *n - слід*
trade *n – професія, торгівля*
tradition *n - традиція*
traditional *a - традиційний*
traffic *n – транспорт, рух*
train *n - потяг*
training *n – виховання, навчання*
transform v *- перетворювати*
transformation *n - перетворення*
transformer *n - трансформатор*
transistor *n - транзистор*
transition *n – перехід, переміщення*
transitional *a - перехідний*
transmission *n – передача по радіо*
transmit v *- передавати*
transparency *n - прозорість*
transparent *a – ясний, прозорий*
travel v *- мандрувати*
tray *n - піднос*
treat v *- лікувати, обробляти, частувати*
treatment *n - обробка*
tremendous *a - величезний*
trend *n – напрям, тенденція*
trick *n – трюк, фокус*
trouble *n – турбота, клопіт*
true *a – вірний, правильний*
truly *adv - справді*
trust *n – довір'я, відповідальність*
try v *- намагатися*
tube *n – трубка, електрична лампа*
tuition *n - навчання*
turn v *- повертатися*
tutor *n – наставник, репетитор*
TV *n - телевізор*
twice *adv - двічі*
twin a *- подвійний*
type *n – тип, зразок*
typical a *- типовий*
typing *n – друкування*

U

unable *a - неспроможний*
unbelievable *a - неймовірний*
uncertain a *- невпевнений*
under *prp – під, нижче*
undergo (underwent, undergone) v *– зазнавати, переносити*
undergraduate *n – студент останнього курсу, аспірант*
underground *n – під землею, метро*
underwater a *- підводний*
undoubtable *a - безсумнівний*
uneven *a – нерівний, непарний*
unexpected a *- несподіваний*
unfortunately *adv – на жаль*
uniform a *- однорідний*
unit *n – одиниця, блок*
universal *a - загальний*
universally *adv - загально*
universe *n - всесвіт*
university *n - університет*
unknown *a - невідомий*
unless *cj – якщо не*
unlike *a - несхожий*
unlikely *adv - на відміну від*
unlimited *a - безмежний*
unload *v - розвантажувати*
unquestionable *a - безперечний*
unsolved *a - невирішений*
unthinkable *a - немислимий*

until *cj – доти, поки*
unused *a* - *невикористаний*
unusual *a* - *незвичайний*
up to *prp – у гору, до, вище*
upon *prp – на, в*
urban *a* - *міський*
usage *n* - *уживання*
use *n* - *застосування*
useful *a* - *корисний*
usefulness *n* - *придатність*
useless *a* - *некорисний*
user *n* - *користувач*
usual *a* - *звичайний*
usually *a* - *звичайно*
utilize *v* - *використовувати*

V

vacation *n* - *відпустка*
vacuum *n* - *вакуум*
valid *a* - *дійсний*
value *n* - *цінність*
valve *n* - *клапан, лампа*
vaporize v - *випаровувати*
varied *a* - *різноманітний*
variety *n* - *різноманітність*
various *a* - *різний*
vary v - *відрізнятися*
vast *a* - *широкий, безкраїй*
vehicle *n – засіб пересування*
velocity *n* - *швидкість*
Venus *n* - *Венера*
versatile *a* - *різнобічний*
versatility *n* - *багатосторонність*
version *n* - *версія, варіант*
vertical a - *вертикальний*
very *adv – дуже*
via *prp* - *через*
vibrate v - *коливатися*
vibration *n – коливання, вібрація*
vice versa *adv* - *навпаки*
vicinity *n* - *сусідство, район*
victory *n* - *перемога*
view *n* - *вид, пейзаж, вигляд*
village *n* - *село*
violin *n* - *скрипка*
virtue *n – доброчинність, чеснота*
virtually *adv* - *фактично*
visible *a* - *видимий*
vision *n* - *зір, видіння*
visit *n* - *відвідування*
visual *a – зоровий, наочний*
vital *a* - *життєвий*
vocational - *професійний*
voice *n* - *голос*
voltage *n* - *напруга*
voltmeter *n* - *вольтметр*
volume *n – ємність, об'єм*

W

wait v - *чекати*
walk v - *ходити, гуляти*
wall *n* - *стіна*
wander v *– блукати, марити*
want v - *хотіти, бажати*
war *n* - *війна*
warm *a* - *теплий*
warming *n – тепло, зігрів*
warmth *n – тепло, сердечність*
warn v - *попереджати*
warning *n* - *попередження*
warrior *n* - *воїн, боєць*
wash *n* - *умивання*
waste *n* - *розтрачання*
watch v - *спостерігати*
water *n* - *вода*
watertight *a* - *водонепроникний*
wave *n* - *хвиля*
wavy *a* - *хвилястий*
way *n – дорога, шлях*
weak *a* - *слабкий*
weapon *n – зброя*
wear (wore, worn) v - *носити*
weather *n* - *погода*
week *n* - *тиждень*
weigh v - *зважувати (ся)*
weight *n* - *вага*
welding *a* - *зварювання*
well *adv* - *добре, гаразд*
wheel *n – колесо, штурвал*
whenever *cj* - *коли ж, коли б не*
whereas *cj – тоді як*
while *cj* - *доки, у той час як*
whole *a* - *весь, цілий*
why *adv* - *чому*
wide *a – широкий, обширний*
widely *adv – широко, далеко*
widen v - *поширювати*
width n *– ширина, широта*
wife n *– дружина, жінка*
will v *– намір, бажання, схильність*
willingly *adv – за бажанням, добровільно*

win (won) v - *перемагати*
wind n - *вітер*
wire n – *дріт, провід*
wise a - *мудрий*
wish v - *бажати*
within *prp – в, у межах, в середині*
without *prp* - *без*
withstand (withstood) v – *вистояти, чинити опір*
wonderful a - *чудовий*
work v - *робити*
workable a – *здатний працювати*
worker n - *працівник*
working – *працюючий, робочий*
workshop n – *майстерня, цех*
world n – *світ, всесвіт*
worry n – *тривога, неспокій*
worth a – *вартий, цінний*
wrist n – *зап'ясток*
wrong a – *неправильний, не той, поганий*

Y

year n - *рік*
yellow a - *жовтий*
yet *adv – досі, ще, все ж*

Z

zinc n - *цинк*
zone n – *зона, пояс, район*

Навчальне видання

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